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STUDY OF A GROUND ACCESS SYSTEM FOR O'HARE INTERNATIONAL AIRPORT

Final Report Volume Two
Recommended Access System Plan

Prepared for
CITY OF CHICAGO
DEPARTMENT OF PUBLIC WORKS

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STUDY OF
A GROUND ACCESS SYSTEM FOR
O'HARE INTERNATIONAL AIRPORT
(D-1-002)

VOLUME II
FINAL REPORT

RECOMMENDED O'HARE ACCESS SYSTEM PLAN

December 1973

Prepared For

CITY OF CHICAGO
DEPARTMENT OF PUBLIC WORKS

By

ALAN M. VOORHEES & ASSOCIATES, INC.
Westgate Research Park
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I. INTRODUCTION

The continued growth of airline traffic and its related activity at O'Hare International Airport will place increasing stress on the supporting ground access system. With the prospect of passenger enplanements increasing by over 50 percent by 1985,[1] the City of Chicago recognized the need for conducting a comprehensive study of O'Hare's ground access system and retained Alan M. Voorhees & Associates, Inc. to prepare a regional access plan. This plan is intended to meet O'Hare's ground access needs at the 30 million annual passenger enplanement level.

The work to be performed in access plan development was divided into three phases. Phase I consisted of the development of a detailed work program for the study and the assembly of relevant data. Phase II focused on the evaluation of the CBD-O'Hare system alternatives. Phase III consisted of detailing and refining the recommended CBD-O'Hare system along with completing those elements of the study necessary for the recommended access plan to be regional and comprehensive in scope.

The final report for the study consists of two volumes. Volume I covers the studies and evaluation analyses performed in Phases I[2] and II. This document, Volume II, presents the recommended access plan for O'Hare.

---

[1] Landrum and Brown, Inc., Airport Layout Plan Report for Chicago-O'Hare International Airport; Prepared for City of Chicago, 1971.

[2] A detailed description of the Study Work Program is presented in the report, Alan M. Voorhees & Associates, Inc., Work Program, Study of a Ground Access System for O'Hare International Airport, November 1971.

DEVELOPMENT OF CBD-O'HARE ACCESS ALTERNATIVES

During the course of Phase II work, a number of alternative CBD oriented airport access systems were analyzed. The intention of such an effort was to develop a comprehensive listing of potential alternatives for further analysis, testing, and evaluation. Six fixed route alternatives were identified as potentially feasible airport systems. Additionally, three other systems were partially evaluated, and recommendations were made for ceasing further study. These were: dual-mode vehicles -- rejected on the basis of continuing technological problems; busways -- rejected on the basis of infeasibility of obtaining required highway lanes; and use of the Soo Line right-of-way -- rejected because of the impracticability of right-of-way usage due to railroad yard congestion and capacity constriction.

Of the six remaining fixed route alternatives, a selection process identified those for further testing which would (1) encompass differing routes, and employ differing access and distribution methods such that resulting impacts could be more readily assessed; and (2) provide alternatives with wide levels of service characteristics. The four alternatives finally selected for testing were:

- Alternative #1 - CTA Extension/Distributor System -- in which the existing CTA Kennedy Line would be extended to O'Hare, and in which a tunnel connection would be provided between the Kennedy Line (Milwaukee Service) and the proposed Distributor System in downtown Chicago. Through service would be provided between Distributor System stations and O'Hare.
- Alternative #2 - CTA/C&NW/Distributor System -- in which the Kennedy Line extension and the use of the Distributor System would be incorporated in a system using the right-of-way of the Chicago and North Western between Jefferson Park and the downtown Distributor connection. Express service would be possible between downtown and Jefferson Park.

- Alternative #4 - CTA Extension -- in which the Kennedy Line extension to O'Hare would be the principal element. In the downtown area the present routing of the Milwaukee Service -- using the Dearborn Street Subway -- would be followed.
- Alternative #5 - CTA/C&NW Terminal -- in which the Kennedy Line would be extended to O'Hare, and the C&NW right-of-way used between Jefferson Park and downtown. The service would terminate in a proposed downtown airline terminal located in the general vicinity of the C&NW Station.

These alternatives were tested assuming a dual service concept with both local and premium service to the airport. The dual service concept evolved because it is felt that the mixing of airport-oriented and non-airport oriented system users will result in unsatisfactory service to both groups, particularly as cars exceed their seating capacity. Premium service is intended to become the primary transit mode of access of CBD air travelers, while local service is intended to serve non-airport oriented system users, airport employees, and some categories of airport visitors. The provision of dual service will assure the air passenger of adequate system capacity for a convenient and comfortable access trip similar to that afforded by taxi or airport bus.

The basic plan recommended for CBD-O'Hare access was that represented by Alternative #4 - CTA Extension. This alternative -- with special airport service -- can effectively meet needs up to the 30 million annual enplanement level at O'Hare. This plan is detailed in this report, along with other elements of a regional access plan. Its general location is shown in Figure I-1.

CONTENTS OF VOLUME II

The remainder of this report consists of two sections, as follows:

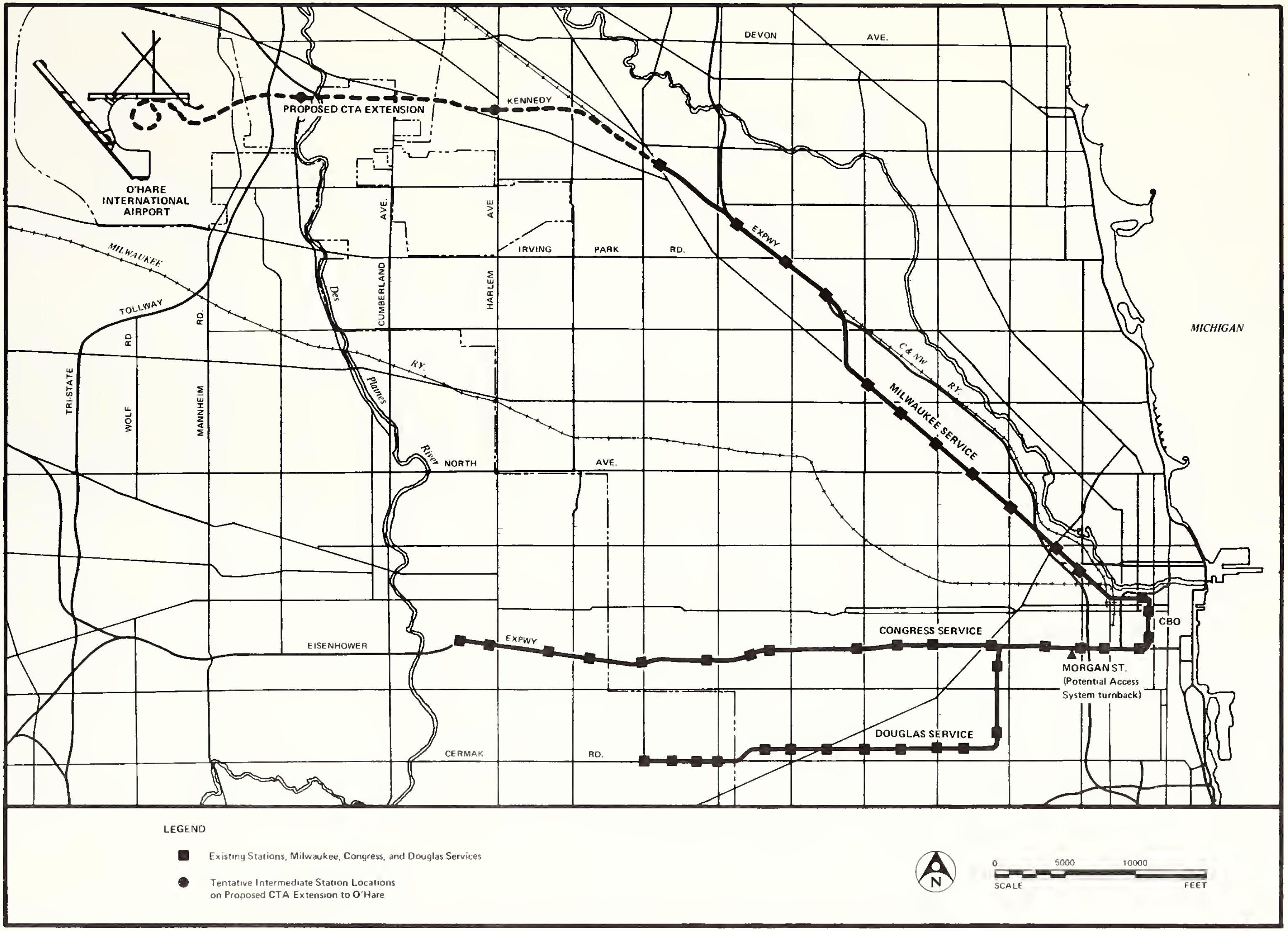

O'HARE INTERNATIONAL AIRPORT
PROPOSED CTA EXTENSION
KENNEDY
EXPWY
DEVON
AVE.
IRVING
PARK
RD.
MILWAUKEE SERVICE
C & NW
RY.
MICHIGAN
MILWAUKEE
TOLLWAY
TRI-STATE
WOLF
RD
MANNHEIM
RD.
CUMBERLAND
AVE.
HARLEM
AVE
Des
Plaines
River
RY.
NORTH
AVE.
EISENHOWER
EXPWY
CONGRESS SERVICE
CBD
MORGAN ST.
(Potential Access System turnback)
DOUGLAS SERVICE
CERMAK
RD.
LEGEND
■ Existing Stations, Milwaukee, Congress, and Douglas Services
● Tentative Intermediate Station Locations on Proposed CTA Extension to O'Hare
N
0
5000
10000
SCALE
FEET

FIGURE I-1 LOCATION MAP, CBD-O'HARE ACCESS CORRIDOR

- II. RECOMMENDED CBD-O'HARE SYSTEM -- This section presents a description of right-of-way, signals and power requirements, vehicle characteristics, and operational alternatives. It describes various aspects of terminal design and support facilities. Construction estimates, and revenue and operating cost projections are made for an eight-year period. Environmental factors to be considered are enumerated.

- III. REGIONAL ACCESS SYSTEM -- This section examines highway elements of airport access, traffic demand, and programmed improvements to the highway system. The roles of regional transit and limousine services are described, as well as the attributes of information systems relating to airport access.

II. RECOMMENDED CBD-O'HARE ACCESS SYSTEM

The purpose of this section is to provide some detailing of preliminary design and construction concepts relative to the recommended system -- the #4 Alternative, CTA Extension -- and to provide updated analyses of cost projections and operational alternatives.

As will be described in detail within, the CTA Extension system for O'Hare access includes two service categories or classes (local and premium fare) which would provide a rapid transit connection between Chicago's CBD and the O'Hare Airport. The physical portion of the system between the CBD and Jefferson Park station exists, and requires little or no modification. The portion of the proposed system requiring new construction would extend the existing system beyond Jefferson Park to the airport.

RIGHT-OF-WAY

Route

The proposed CTA rapid transit extension to provide access to O'Hare Airport would be constructed in the median of the John F. Kennedy Expressway. This would extend the existing two-track CTA system from Jefferson Park station (its present terminus), following the Kennedy Expressway route westward to a point just east of the airport. The proposed rapid transit extension would then leave the Expressway median, cross under the inbound roadway of the Illinois Tollway, and continue on the median of the airport access road. At the airport, the system would loop within the three main passenger terminals, thence returning to the airport access highway median. (See Figure II-1.)

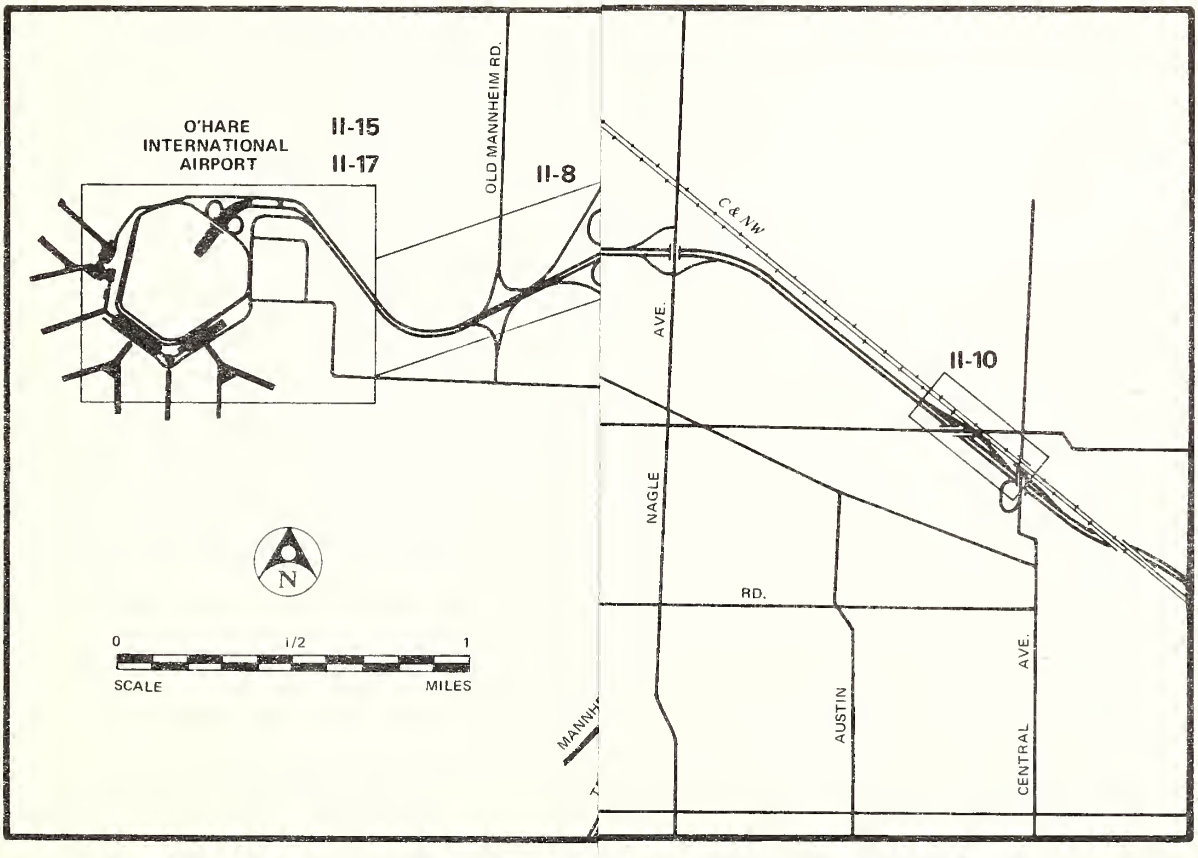

O'HARE
INTERNATIONAL
AIRPORT
II-15
II-17
OLD MANNHEIM RD.
II-8
C & NW
II-10
NAGLE
AVE.
RD.
AUSTIN
CENTRAL
AVE.
MANNH
N
0
1/2
1
SCALE
MILES

FIGURE II-1 PROPOSE OF DETAIL DRAWINGS

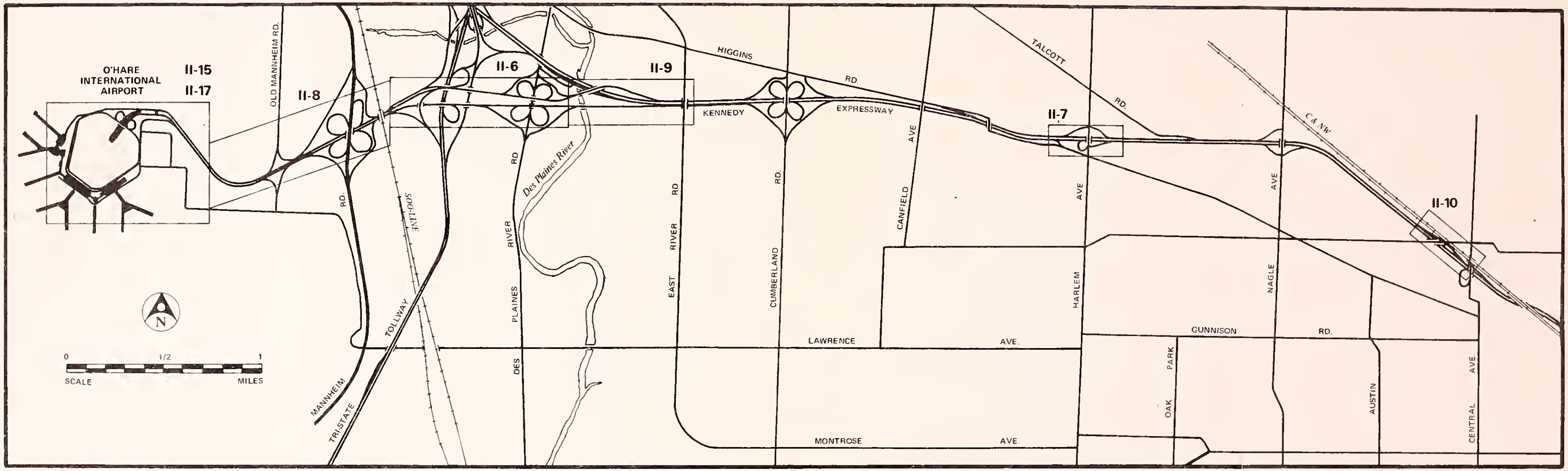

O'HARE
INTERNATIONAL
AIRPORT
II-15
II-17
II-8
OLD MANNHEIM RD.
RD.
II-6
II-9
HIGGINS
RD
TALCOTT
RD.
KENNEDY
EXPRESSWAY
II-7
C & NW
II-10
SOO LINE
TOLLWAY
MANNHEIM
TRISTATE
DES
PLAINES
RIVER
RD
Des Plaines River
EAST
RIVER
RD
CUMBERLAND
RD.
CANFIELD
AVE
HARLEM
AVE
NAGLE
AVE
LAWRENCE
AVE.
GUNNISON
RD.
OAK
PARK
AUSTIN
CENTRAL
AVE
MONTROSE
AVE
N
0
1/2
1
SCALE
MILES

FIGURE II-1 PROPOSED CTA EXTENSION FOR ACCESS SYSTEM - OVERALL VIEW AND LOCATION MAP OF DETAIL DRAWINGS

The medians of both highways are fully capable of accepting the proposed rapid transit construction. Existing median widths are adequate, existing overpasses and bridges have been designed for such a possibility (leaving sufficient clearances between columns and abutments to admit a two-track CTA system), and will require little or no modification.

The existing right-of-way is highly suited for rapid transit, posing few extreme curves or grades. This would in general permit a maximum speed limit of 80 mph for all of its length, with the exceptions of the intermediate station areas and some of the right-of-way west of the Tri-State Tollway (where the speed limit would be 70 mph), and the approach to and the loop area itself within the airport proper.

Track and Roadbed

As the proposed system construction will comprise an extension of the existing CTA rapid transit facility, it would be developed in complete construction conformity with existing general engineering standards for the CTA. Thus, AREA standards would apply to the proposed system, as given in the Manual for Railway Engineering for fixed properties, and in the current edition of the AREA Trackwork Plans and Specifications.

Rail section 9040 ASCE would be used, or its equivalent, depending on economy and anticipated continued availability. Continuous welded rail would be employed, as practical, to reduce track joints required during construction, and to improve ride quality. The minimum rail length to be used for mainline construction is 13 feet. Where required, track joint-bars would be used according to AREA standards.

Where track ties in ballast are employed, the timber used would be oak; cross ties would be of AREA size 3, and switch ties would be AREA #5.

Wooden ties on open deck structures would be pine, employing AREA size 3 tie for both cross and switch ties. Maximum tie spacing for mainline track would be 24 inches, and for storage yards 36 inches.

Ballast material would be AREA No. 4 crushed stone, no less than six inches in depth below the bottom of ties. (See typical right-of-way cross-section in Figure II-2.

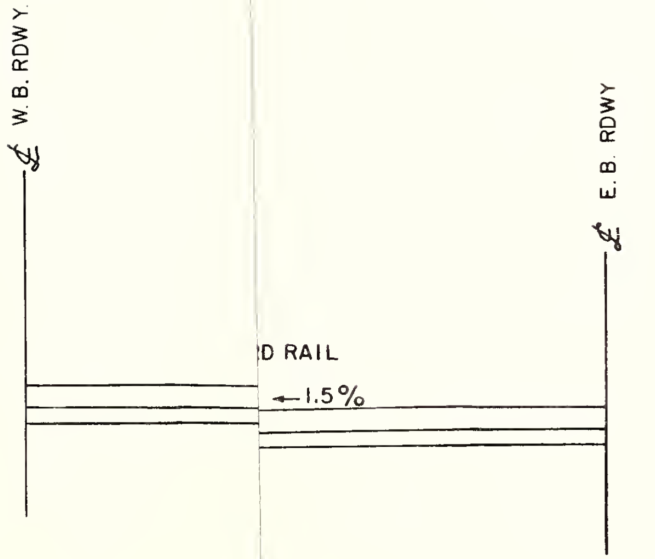
Standard gauge track would be constructed (4 feet, 8 and 1/2 inches), with a 12-foot minimum centerline for adjacent track. In non-station areas, grades would not exceed 4 percent, while in stations and car storage areas, the maximum allowable grade would be 0.5 percent. The minimum radius of curve in non-station areas would be 95 feet, while through station platforms, the minimum curve radius to be used would be 2,000 feet. Curves would be designed to conform to speed aspect commands available in the vehicle control system; namely, 15, 25, 35, 55, and 70 mph. Track superelevations would be limited to an actual maximum of 5 inches.

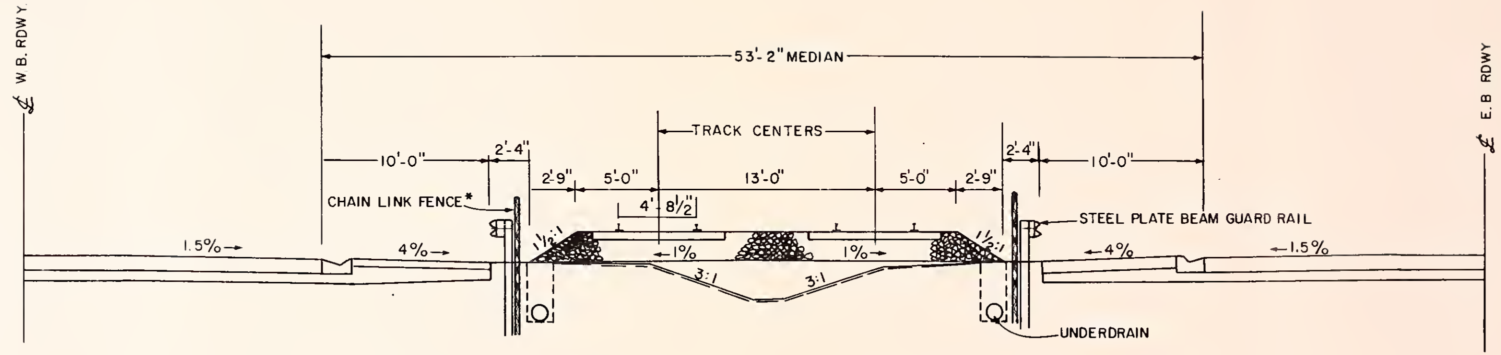
Construction clearances for non-boarding areas not in subways, for non-boarding areas in subways, and for boarding areas are indicated in Figures II-3, II-4, and II-5, respectively.

INTERMEDIATE STATIONS (TENTATIVE)

Two intermediate stations (between Jefferson Park and O'Hare Airport) are tentatively planned in the vicinity of River Road, and Harlem Avenue.

The River Road station and terminal facilities would generally occupy the area between the Tri-State Tollway and Desplaines River Road

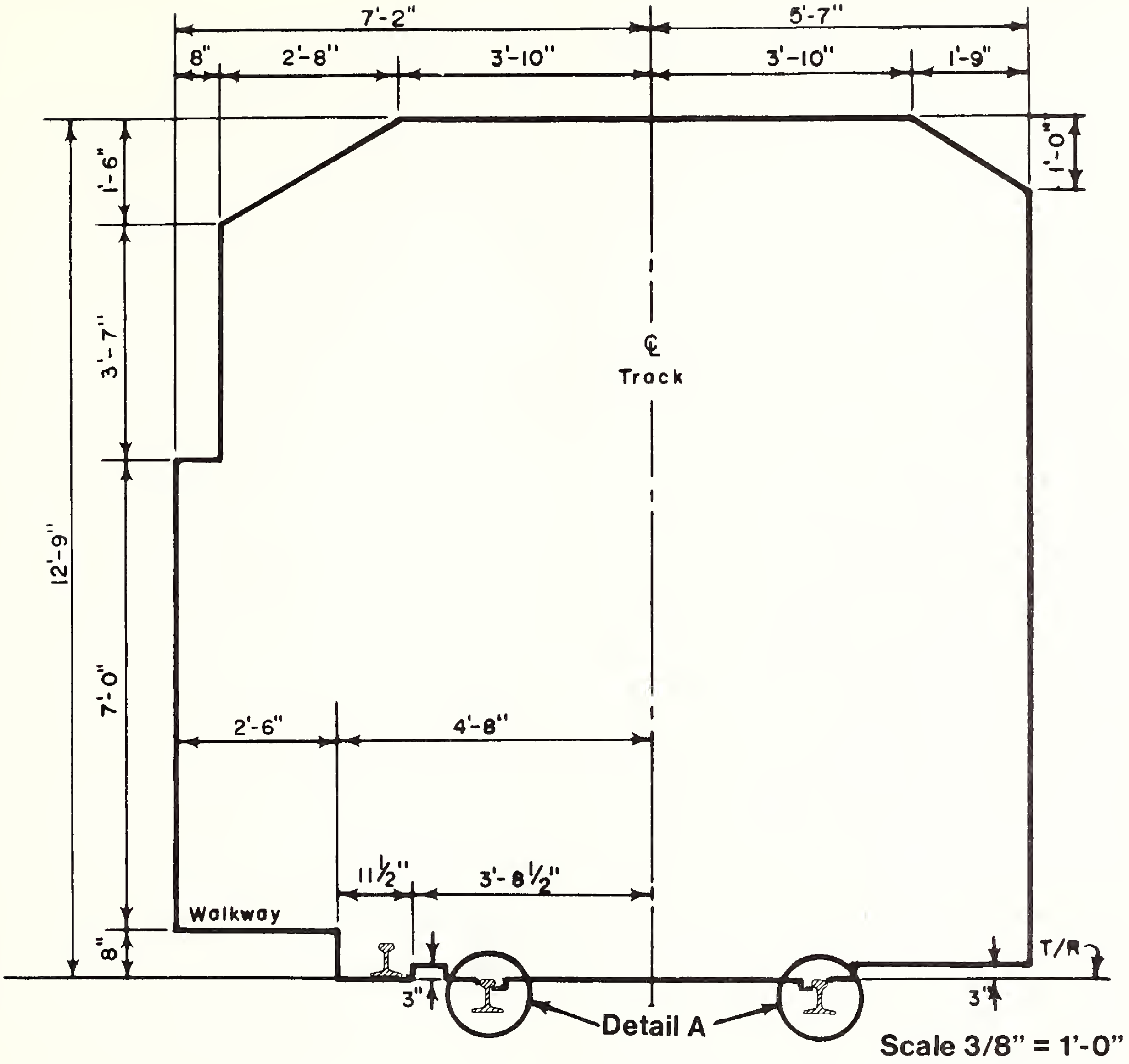

℄ W.B. RDWY.
℄ E.B. RDWY
D RAIL
←1.5%

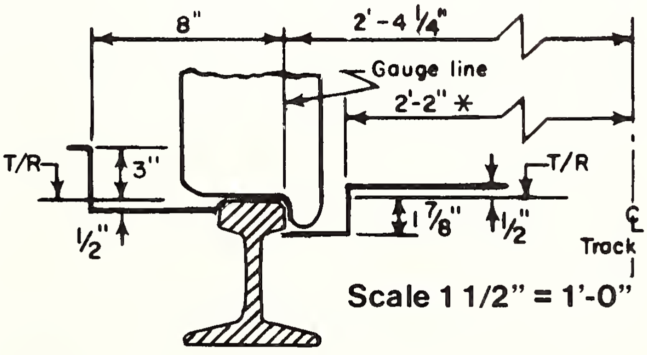

℄ W.B. RDWY.
53'-2" MEDIAN
TRACK CENTERS
10'-0"
2'-4"
2'-9"
5'-0"
13'-0"
5'-0"
2'-9"
2'-4"
10'-0"
4'-8½"
CHAIN LINK FENCE*
STEEL PLATE BEAM GUARD RAIL
1.5%
4%
1½:1
1%
1%
1½:1
4%
1.5%
3:1
3:1
UNDERDRAIN
℄ E.B RDWY

*A continuous 5' high GM barrier wall would be an alternative

Note: Typical Cross Section applies from E. River Rd. to Foster Ave. except at Harlem Ave. Station

FIGURE II-2 ACCESS SYSTEM ROADBED-TYPICAL CROSS SECTION

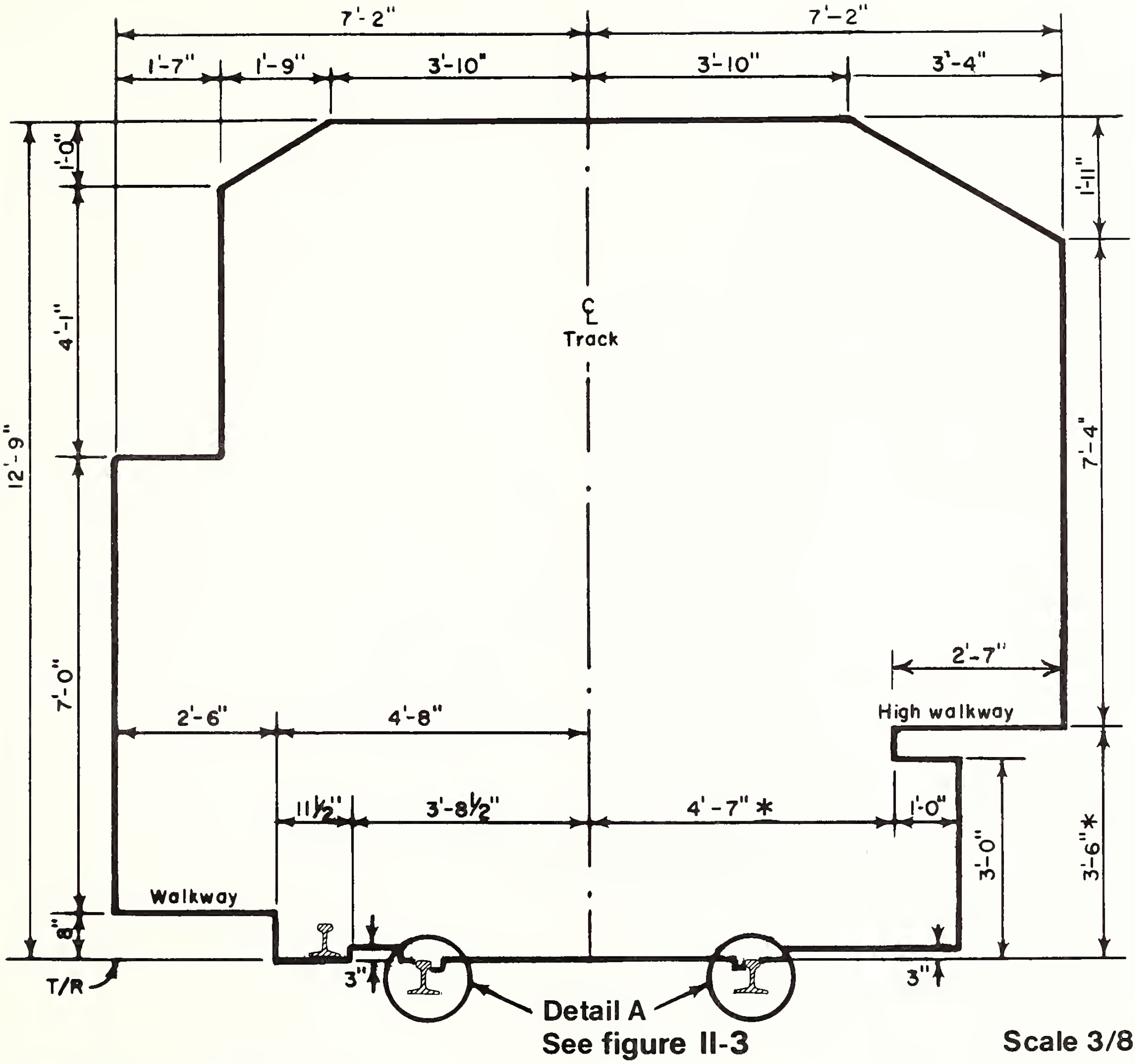

7'-2"
5'-7"
8"
2'-8"
3'-10"
3'-10"
1'-9"
1'-0"
1'-6"
3'-7"
12'-9"
7'-0"
8"
℄
Track
2'-6"
4'-8"
11½"
3'-8½"
Walkway
T/R
3"
3"
Detail A
Scale 3/8" = 1'-0"


8"
2'-4¼"
Gauge line
2'-2" *
T/R
3"
½"
T/R
1⅞"
½"
℄
Track
Scale 1 1/2" = 1'-0"

Source: Chicago Transit Authority

Detail A (Typical for both rails)

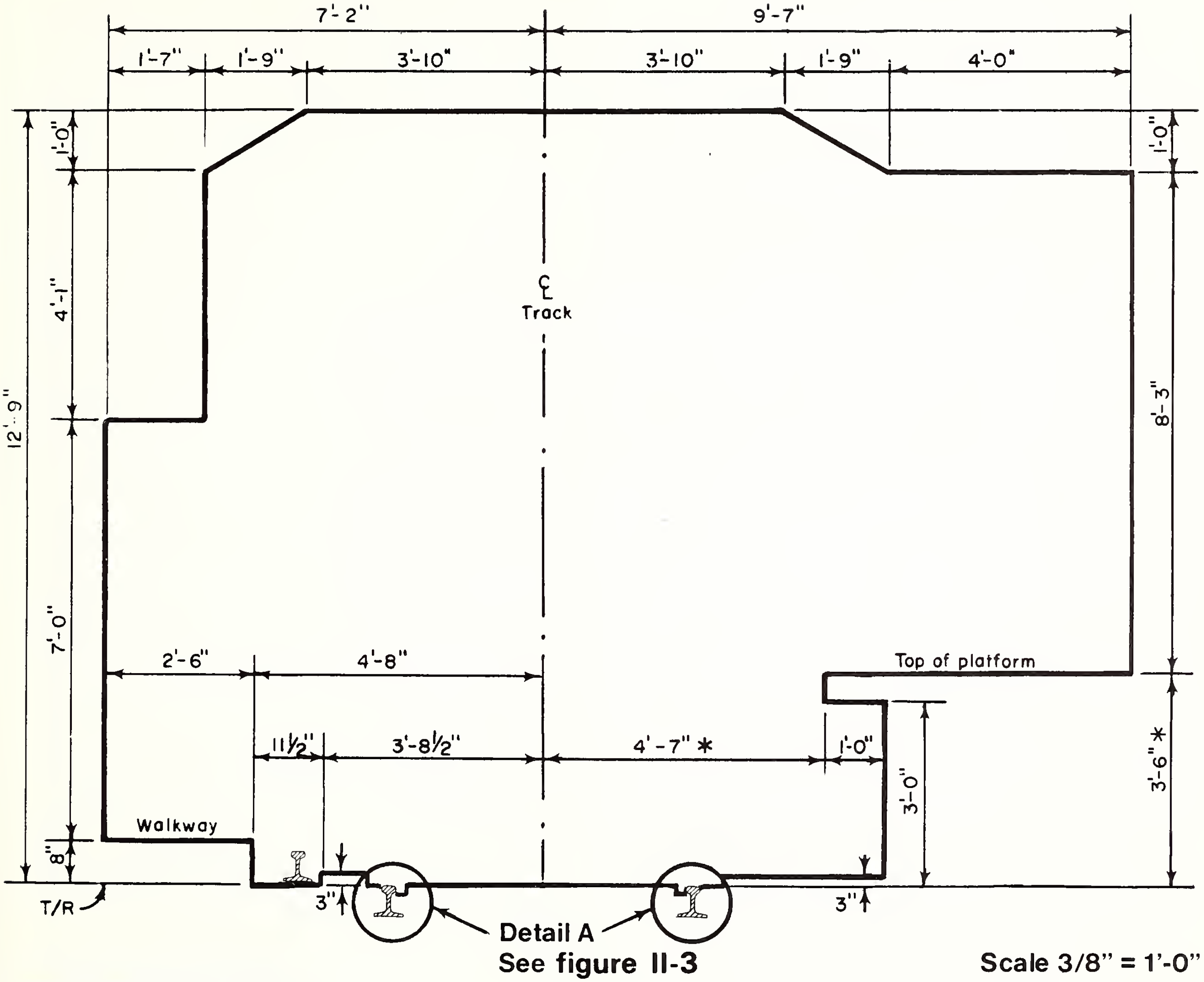
FIGURE II-3 CLEARANCE DIAGRAM AT NON-BOARDING AREA EXCEPT IN SUBWAY


7'-2"
7'-2"
1'-7"
1'-9"
3'-10"
3'-10"
3'-4"
1'-0"
4'-1"
12'-9"
7'-0"
8"
1'-11"
7'-4"
℄ Track
2'-7"
High walkway
2'-6"
4'-8"
11½"
3'-8½"
4'-7" *
1'-0"
3'-0"
3'-6" *
Walkway
T/R
3"
3"
Detail A
See figure II-3

Scale 3/8" = 1'-0"

Source: Chicago Transit Authority

FIGURE II-4 CLEARANCE DIAGRAM AT NON-BOARDING AREA IN SUBWAY


7'-2"
9'-7"
1'-7"
1'-9"
3'-10"
3'-10"
1'-9"
4'-0"
1'-0"
4'-1"
12'-9"
7'-0"
8"
1'-0"
8'-3"
℄
Track
2'-6"
4'-8"
Top of platform
11½"
3'-8½"
4'-7" *
1'-0"
3'-0"
3'-6" *
Walkway
T/R
3"
3"
Detail A
See figure II-3
Scale 3/8" = 1'-0"

Source: Chicago Transit Authority

FIGURE II-5 CLEARANCE DIAGRAM AT BOARDING AREA

(see Figure II-6). The facilities at this station include a park-and-ride lot capable of holding 2,000 cars, a multi-use passenger tunnel connecting the parking lot with the station platform (and other facilities), and a kiss-and-ride area for nearly 40 automobiles with access to Desplaines River Road. Other facilities planned for this location, including a CTA storage yard, maintenance facility, and office building, are described in a subsequent section.

The tentative station near North Harlem Avenue has facilities planned for bus access, a kiss-and-ride standing area (27 car capacity), and a parking deck (see Figure II-7).

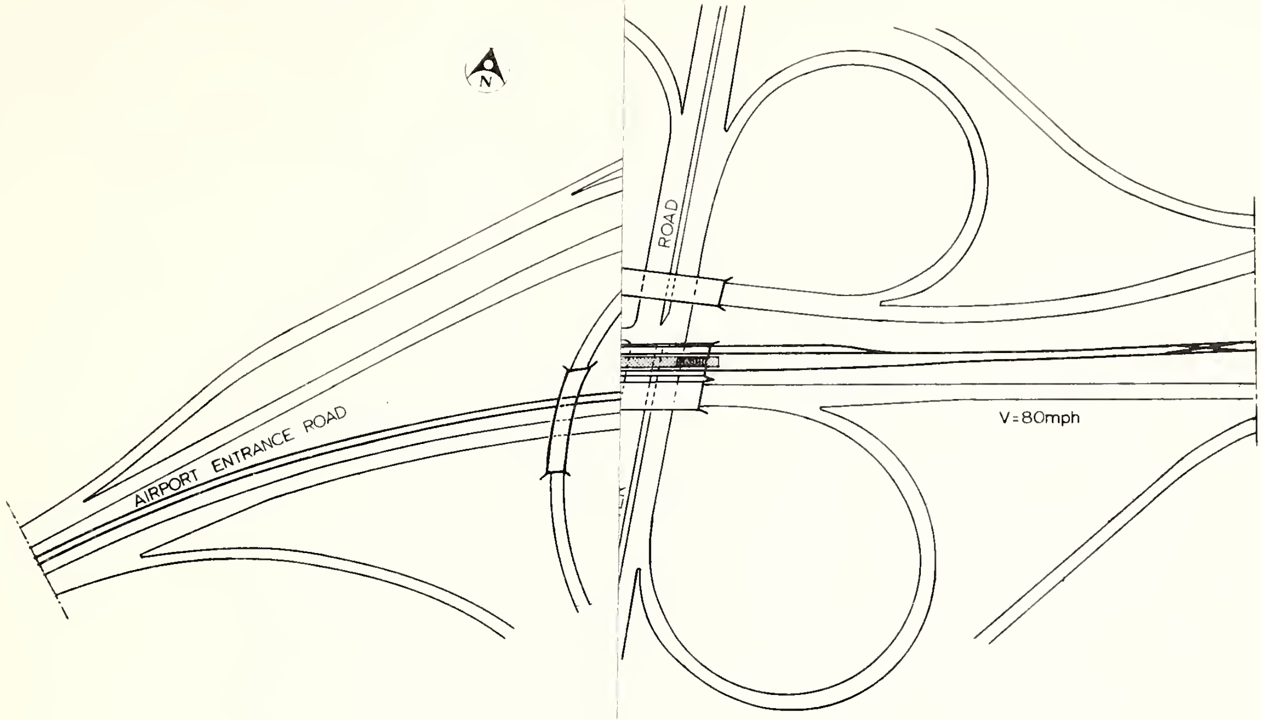
Both station platforms are center-island type, and both are planned to be 520 feet in length. Thus, both stations could accommodate 10 car train lengths. At River Road the platform width is planned to be 19 feet; at Harlem Avenue the width would be 15 feet, 10 inches. Appropriate windbreaks and canopies would be provided to protect passengers.

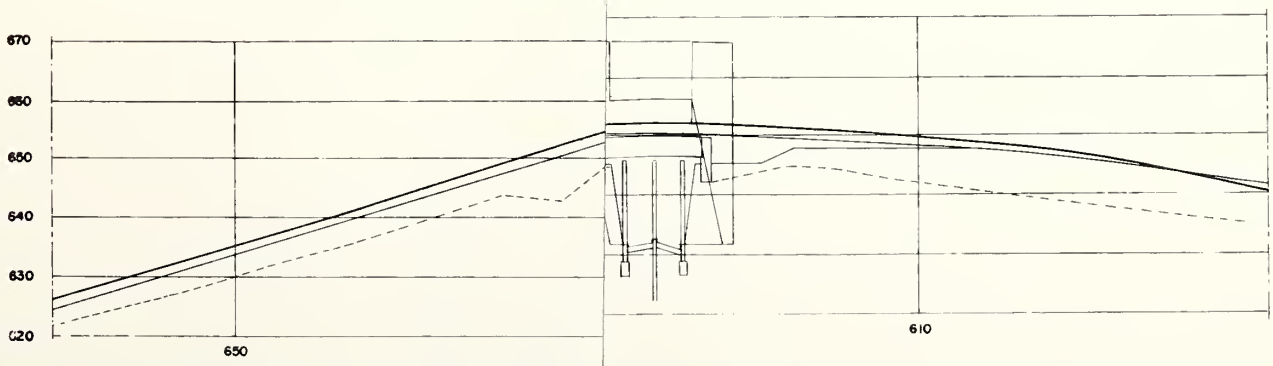
The plan profiles are also indicated in Figures II-8, II-9, and II-10.

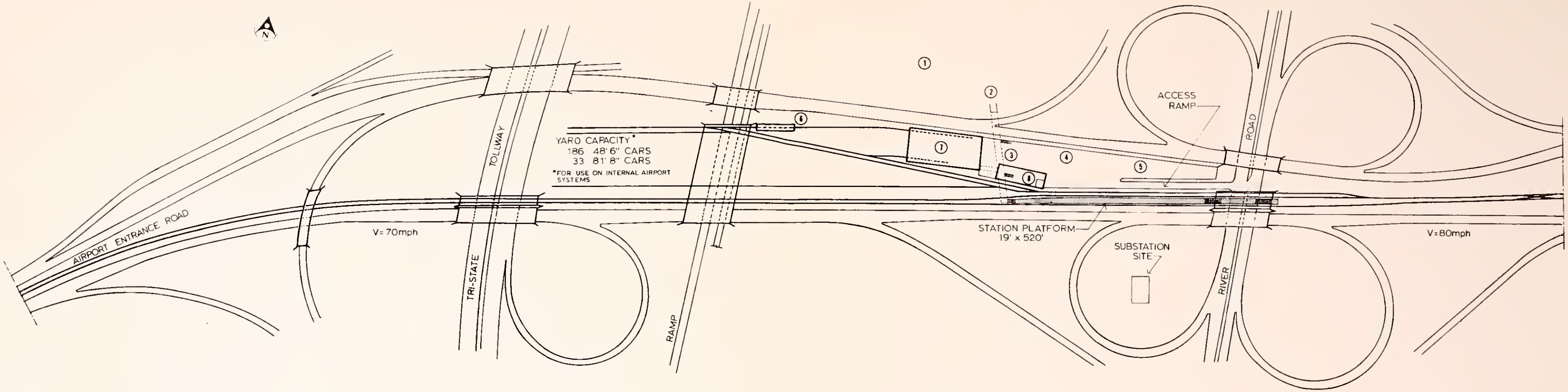
POWER AND CONTROLS

Traction Power System

Vehicles for the O'Hare rapid transit extension would be powered, as are all other CTA trains, from a third rail, 600 volt (nominal) direct current power source. Additional substation locations are indicated in Figures II-6, II-11, and on airport detail drawings in subsequent sections. Two or three 2500 KW power units are to equip each substation, depending on whether a substation's power will be used at a yard location and include its heating loads.


N
ROAD
AIRPORT ENTRANCE ROAD
V=80mph




N
①
②
⑥
⑦
③
④
⑤
⑧
ACCESS RAMP
ROAD
YARD CAPACITY*
186 48' 6" CARS
33 81' 8" CARS
*FOR USE ON INTERNAL AIRPORT SYSTEMS
TOLLWAY
AIRPORT ENTRANCE ROAD
V=70mph
TRI-STATE
RAMP
STATION PLATFORM
19' x 520'
SUBSTATION SITE
RIVER
V=80mph

① PARK-AND-RIDE LOT-2000 CAR CAPACITY
② TUNNEL TO PARKING LOT
③ C.T.A. TRANS OFFICE BLDG-50'x150'-CONNECTED TO TUNNEL VIA STAIRS
④ KISS-AND-RIDE STANDING AREA-37 CAR CAPACITY-CONNECTED TO TUNNEL VIA STAIRS
⑤ C.T.A. EMPLOYEE PARKING-85 CAR CAPACITY
⑥ ENCLOSED CAR WASHER
⑦ MAINTENANCE SHOP-CONNECTED TO TUNNEL AT BASEMENT
110'x225'-5 TRACKS
CAPACITY 16 CARS
⑧ CONTROL TOWER ABOVE TRANSPORTATION OFFICE BLDG-50'x150'

PROFILE

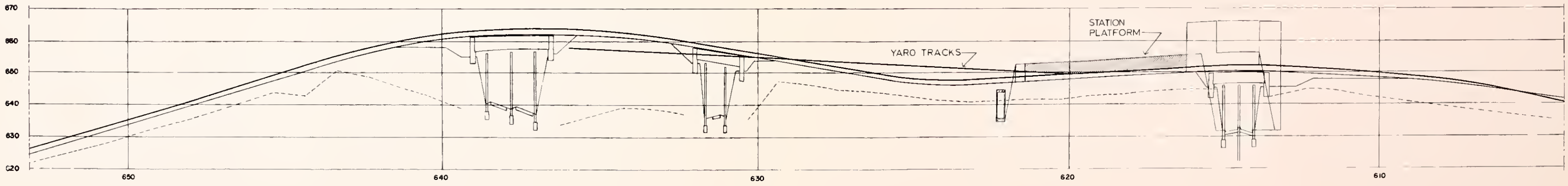

670
660
650
640
630
620
STATION PLATFORM
YARD TRACKS
650
640
630
620
610

FIGURE II-6 TENTATIVE INTERMEDIATE STATION, PLAN AND PROFILE (RIVER ROAD)

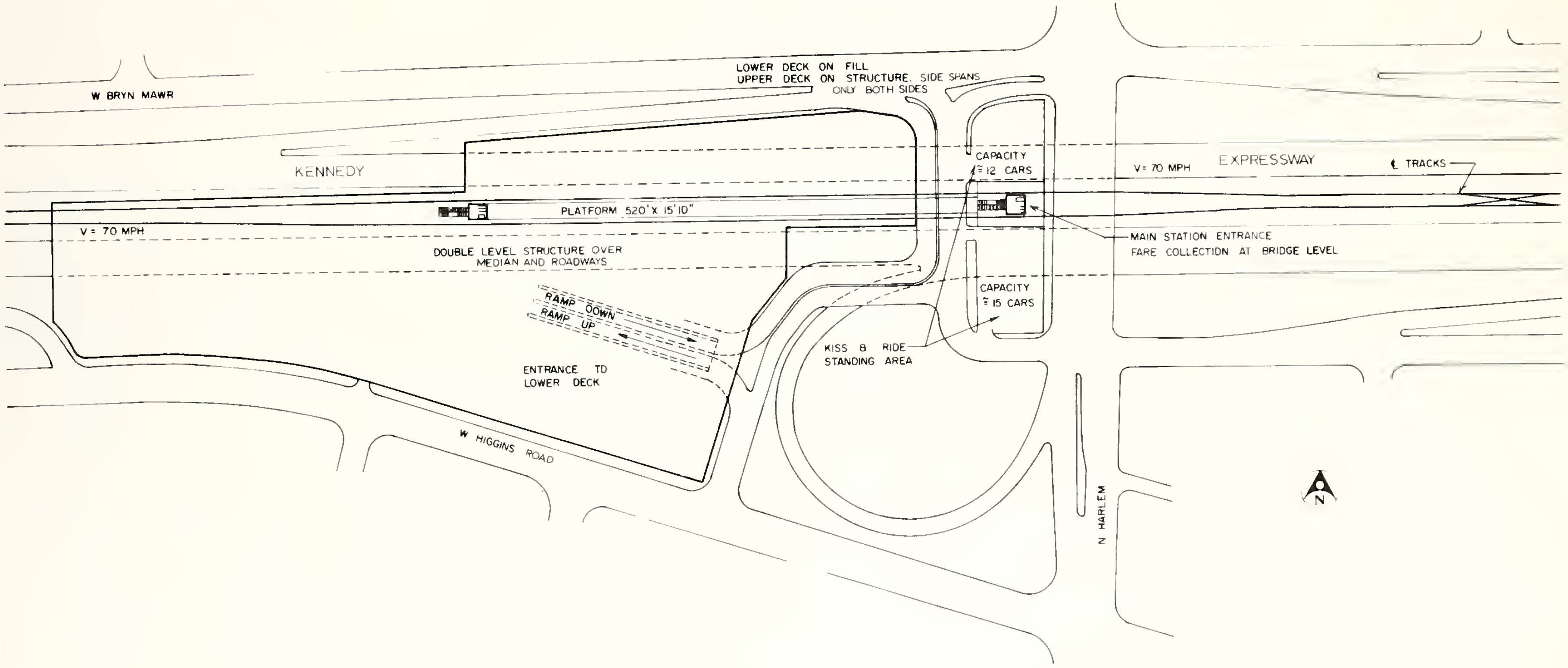
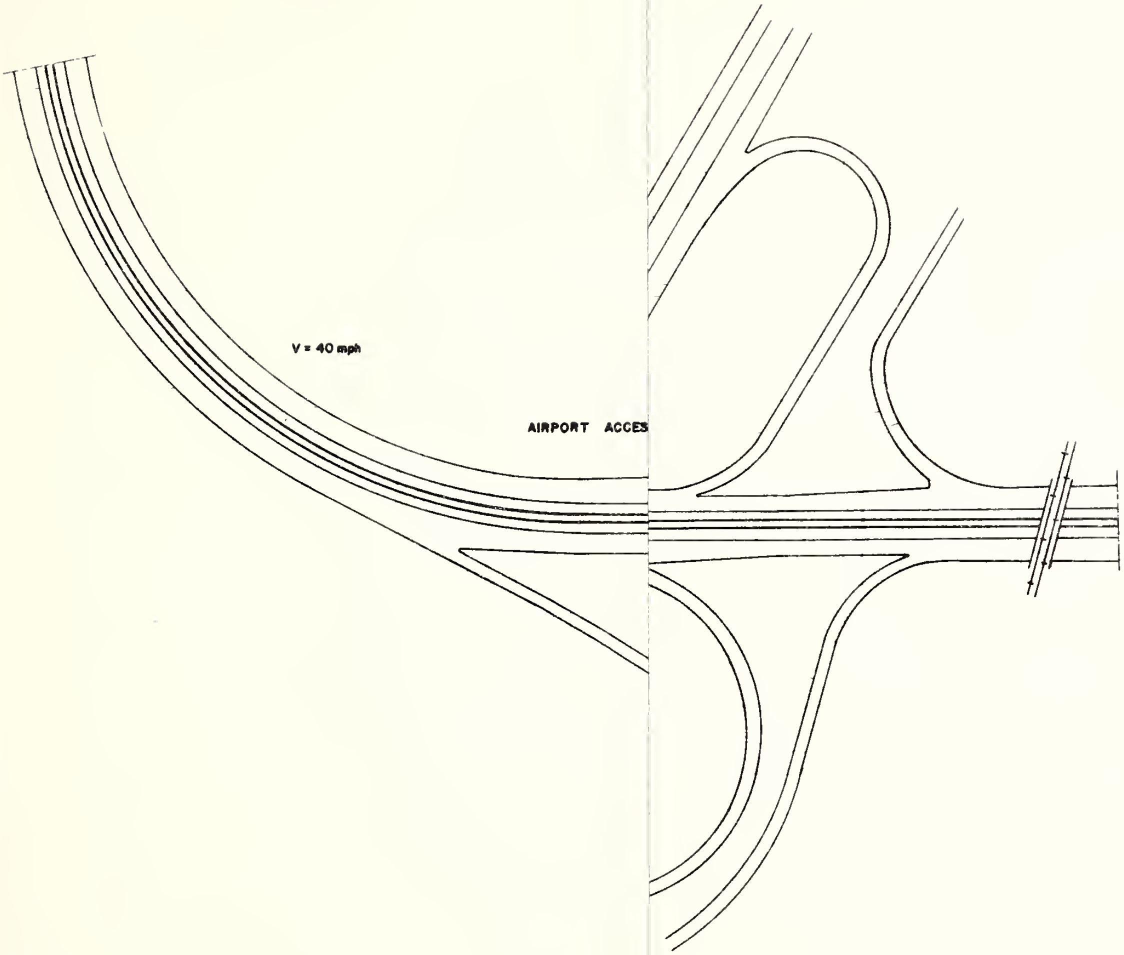

W BRYN MAWR
LOWER DECK ON FILL
UPPER DECK ON STRUCTURE, SIDE SPANS ONLY BOTH SIDES
KENNEDY
EXPRESSWAY
V = 70 MPH
V = 70 MPH
℄ TRACKS
PLATFORM 520' X 15' 10"
CAPACITY ≅ 12 CARS
CAPACITY ≅ 15 CARS
MAIN STATION ENTRANCE
FARE COLLECTION AT BRIDGE LEVEL
DOUBLE LEVEL STRUCTURE OVER MEDIAN AND ROADWAYS
RAMP DOWN
RAMP UP
ENTRANCE TO LOWER DECK
KISS & RIDE STANDING AREA
W HIGGINS ROAD
N HARLEM
N

FIGURE II-7 TENTATIVE INTERMEDIATE STATION PLAN-HARLEM AVENUE


V = 40 mph
AIRPORT ACCES

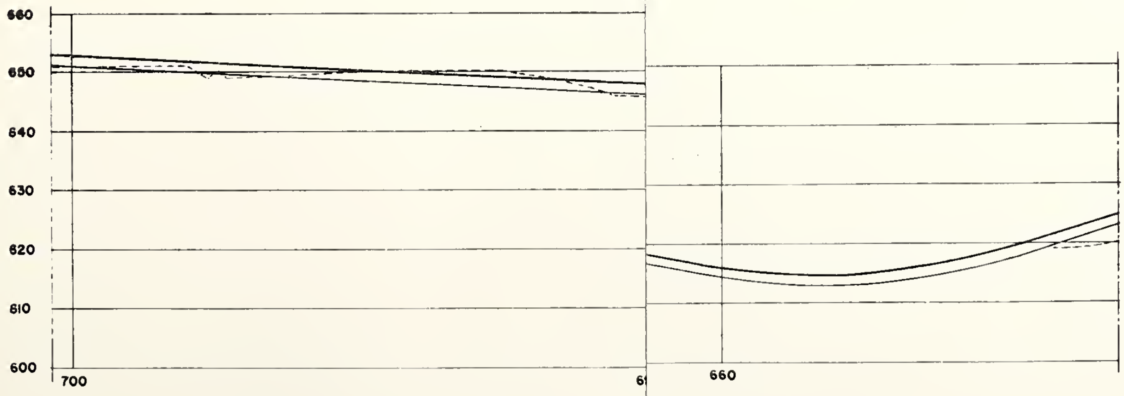
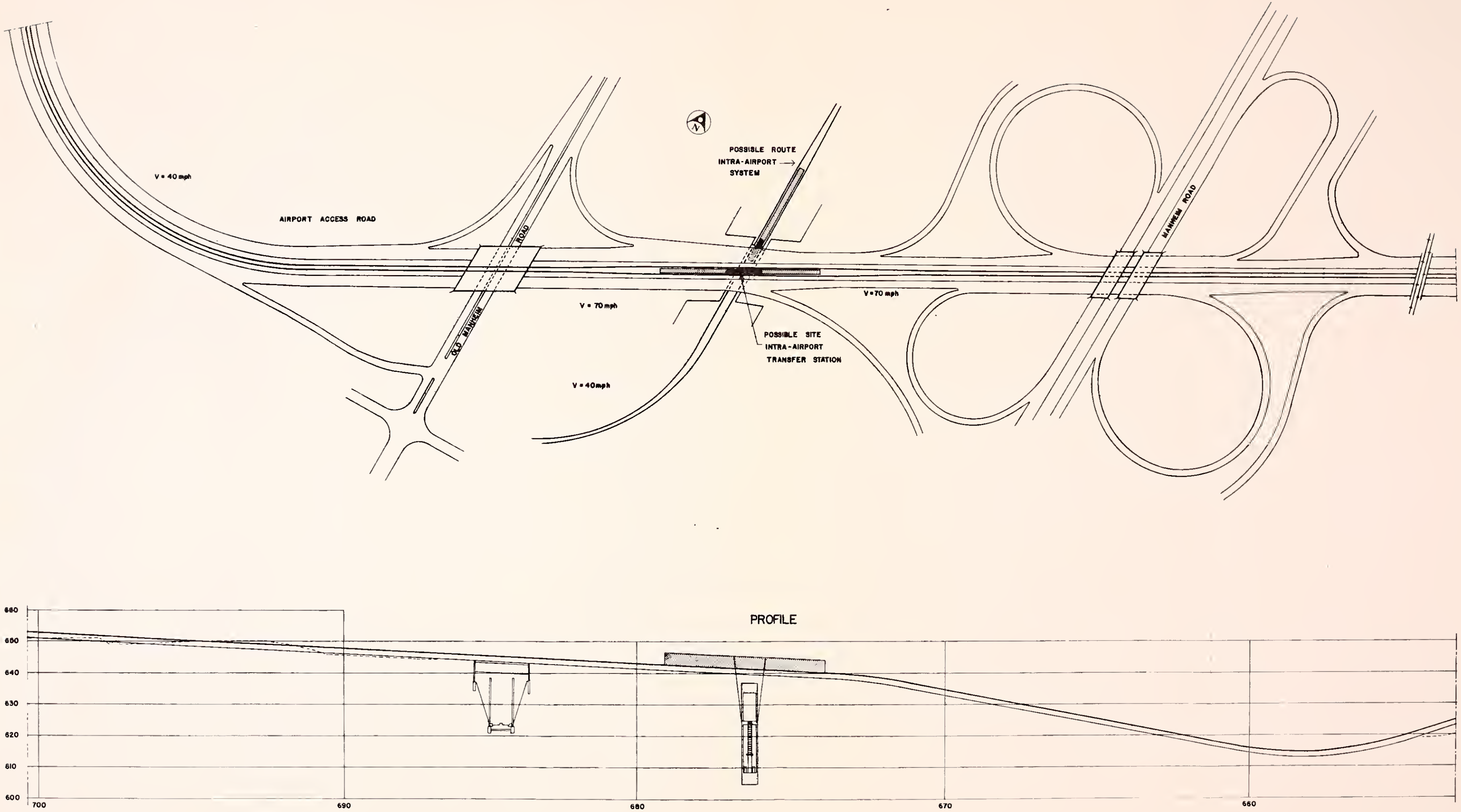
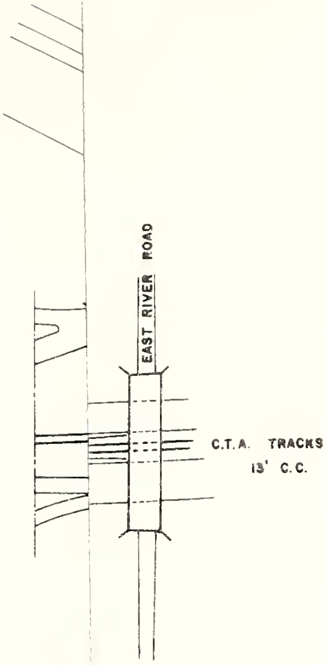
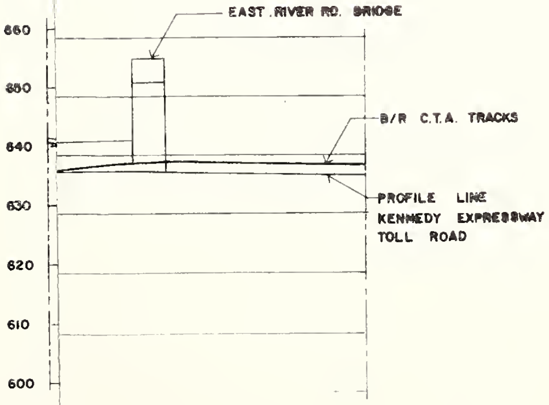

660
650
640
630
620
610
600
700
6
660

FIGURE II-8 ROUTE PLAN AND PROFILE, MANNHEIM ROAD AREA


V = 40 mph
AIRPORT ACCESS ROAD
OLD MANNHEIM ROAD
V = 70 mph
V = 40mph
POSSIBLE ROUTE
INTRA-AIRPORT
SYSTEM
POSSIBLE SITE
INTRA-AIRPORT
TRANSFER STATION
V = 70 mph
MANNHEIM ROAD
N
PROFILE
660
650
640
630
620
610
600
700
690
680
670
660


EAST RIVER ROAD
C.T.A. TRACKS
13' C.C.


EAST RIVER RD. BRIDGE
B/R C.T.A. TRACKS
PROFILE LINE
KENNEDY EXPRESSWAY
TOLL ROAD
660
650
640
630
620
610
600

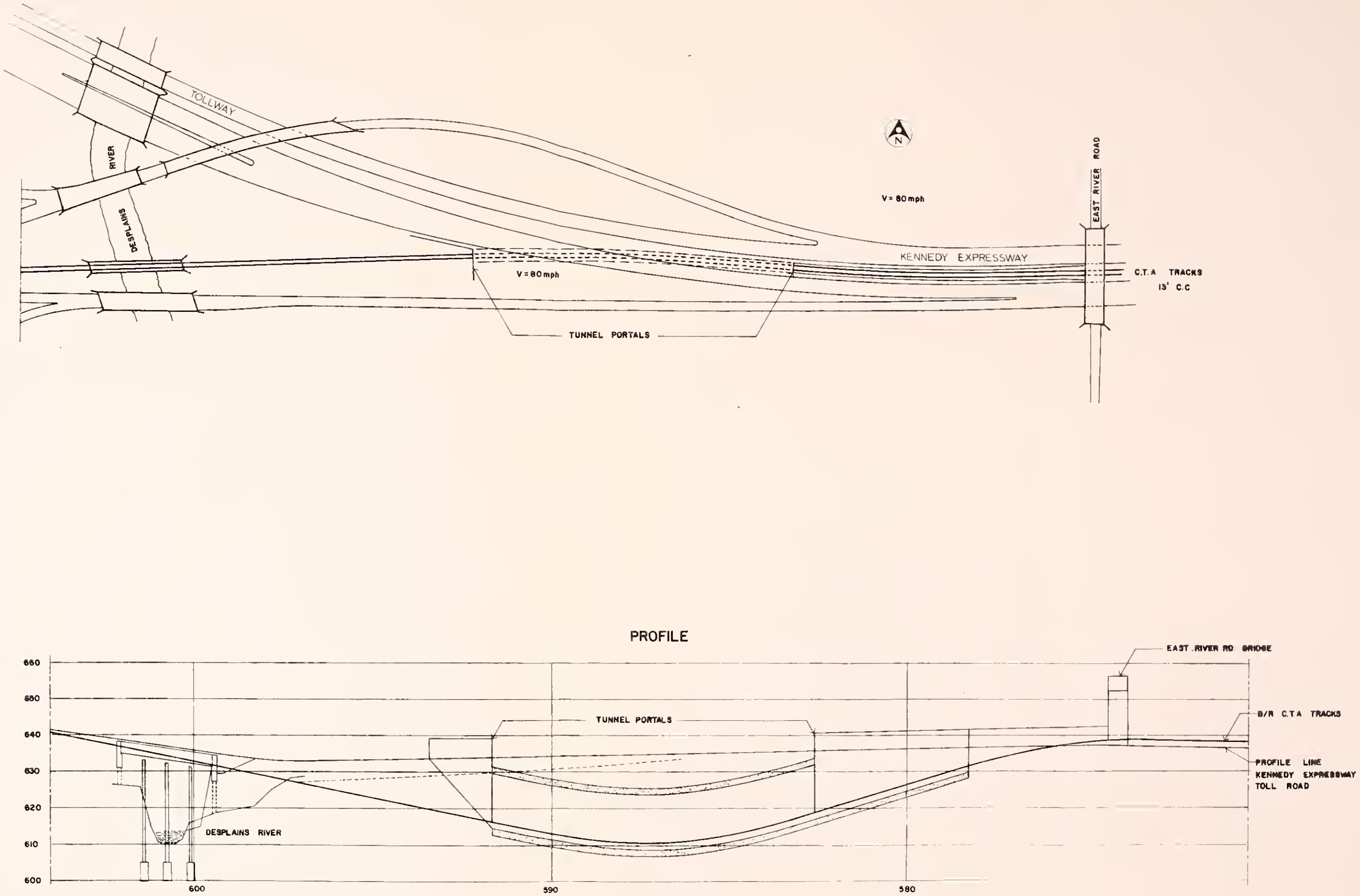

TOLLWAY
RIVER
DESPLAINS
N
V = 80 mph
EAST RIVER ROAD
KENNEDY EXPRESSWAY
V = 80 mph
C.T.A TRACKS
13' C.C
TUNNEL PORTALS
PROFILE
EAST RIVER RD BRIDGE
TUNNEL PORTALS
B/R C.T.A TRACKS
PROFILE LINE
KENNEDY EXPRESSWAY
TOLL ROAD
DESPLAINS RIVER
660
650
640
630
620
610
600
600
590
580

FIGURE II-9 ROUTE PLAN AND PROFILE, EAST RIVER ROAD VICINITY

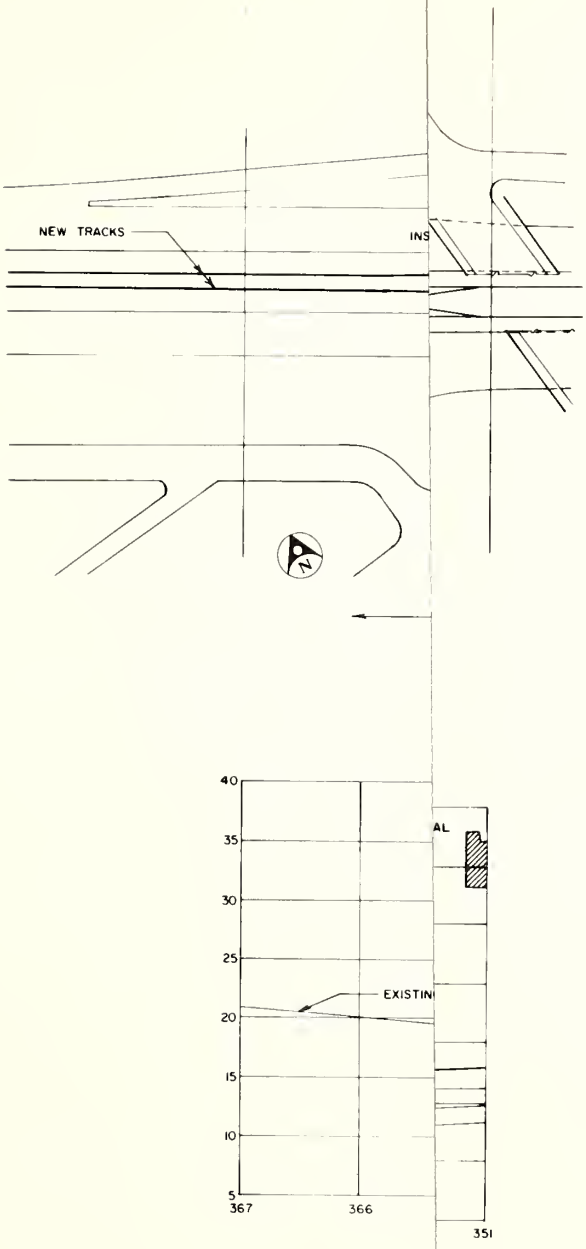

NEW TRACKS
INS
N
40
35
30
25
20
15
10
5
AL
EXISTIN
367
366
351

FIGURE II-

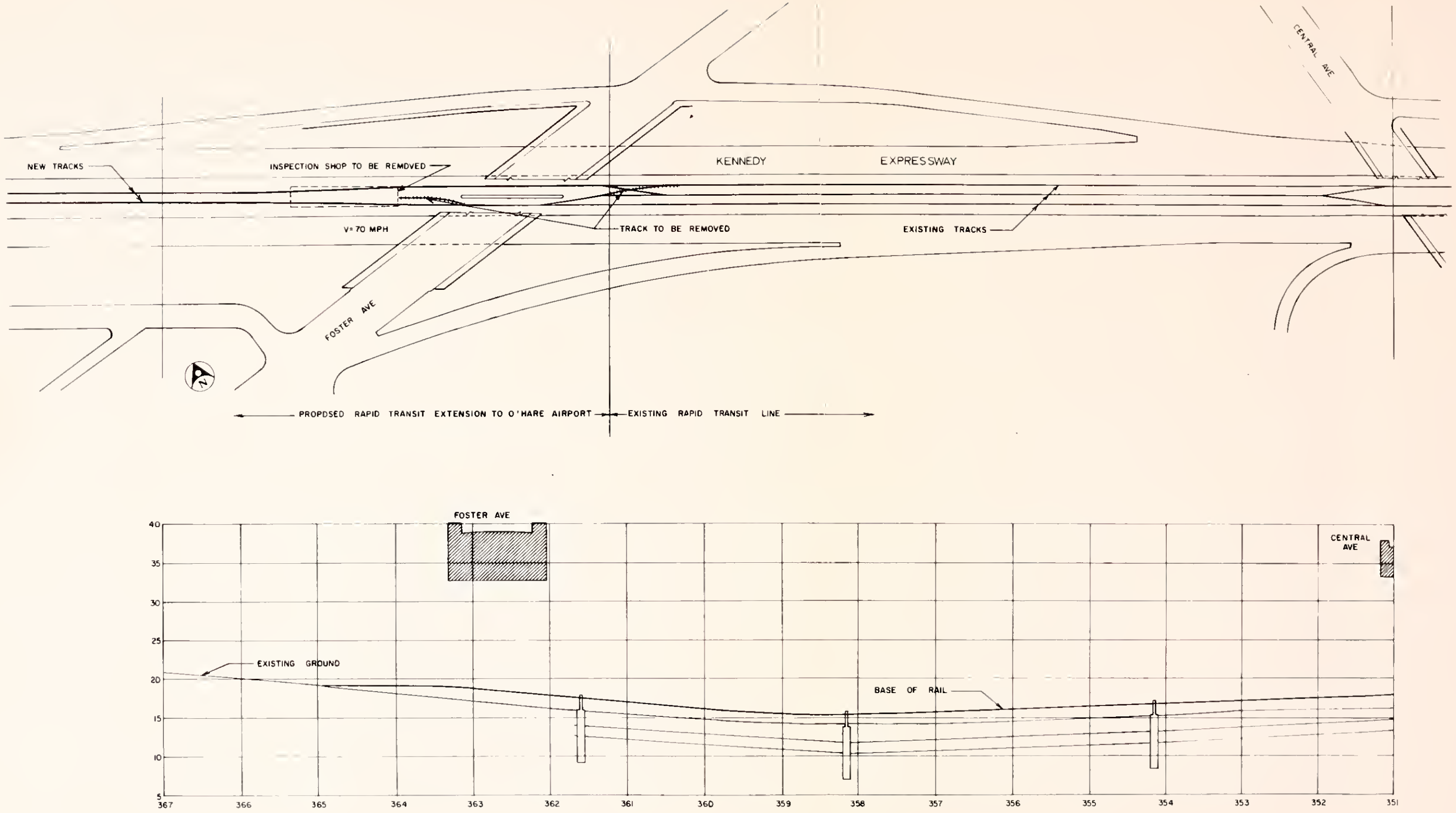

CENTRAL AVE
KENNEDY EXPRESSWAY
NEW TRACKS
INSPECTION SHOP TO BE REMOVED
V=70 MPH
TRACK TO BE REMOVED
EXISTING TRACKS
FOSTER AVE
N
PROPOSED RAPID TRANSIT EXTENSION TO O'HARE AIRPORT
EXISTING RAPID TRANSIT LINE
FOSTER AVE
CENTRAL AVE
EXISTING GROUND
BASE OF RAIL
40
35
30
25
20
15
10
5
367
366
365
364
363
362
361
360
359
358
357
356
355
354
353
352
351

FIGURE II-10 PLAN AND PROFILE-CONNECTION, PROPOSED EXTENSION TO EXISTING SYSTEM-JEFFERSON PARK AREA

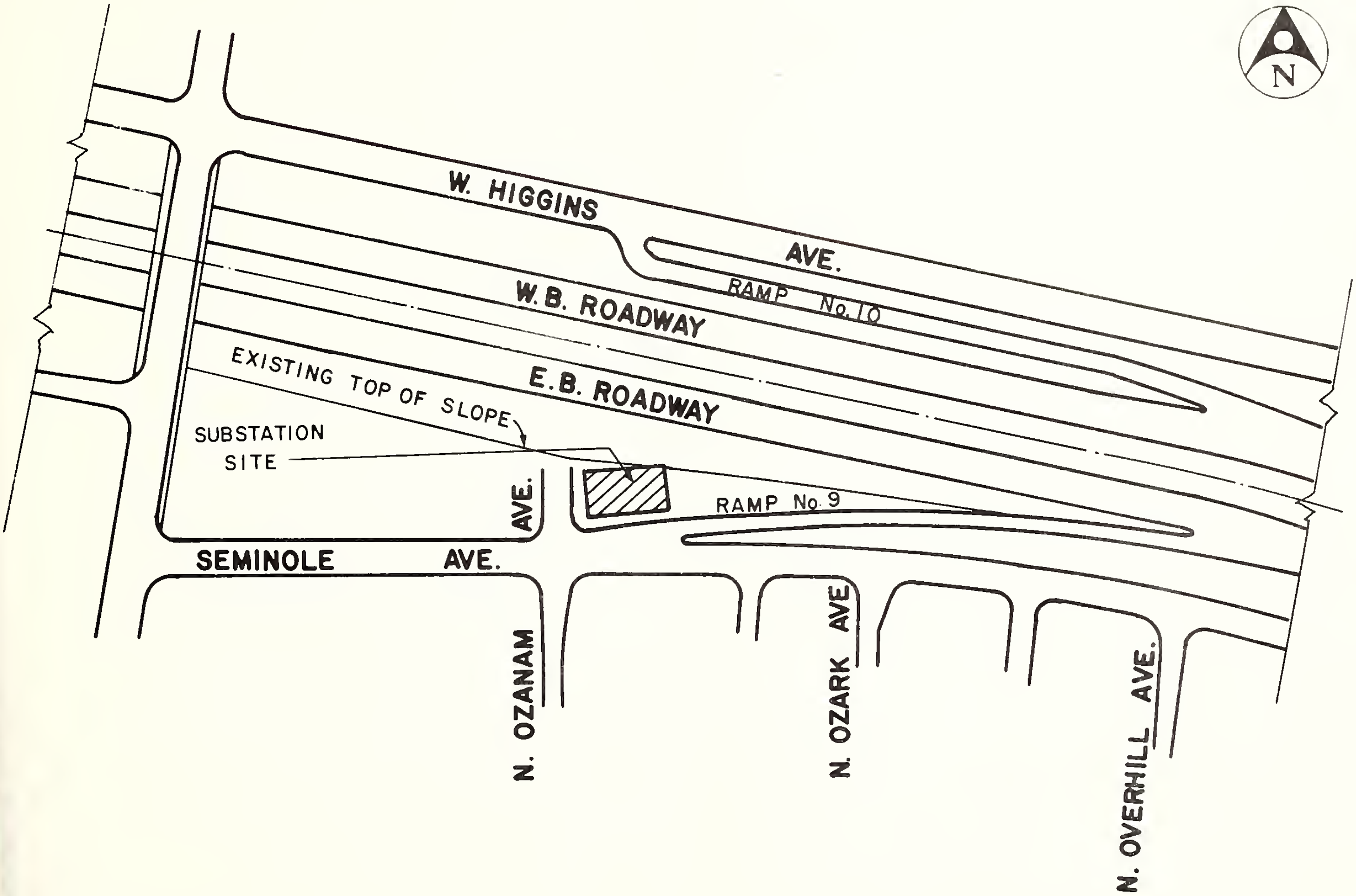

N
W. HIGGINS
AVE.
RAMP No. 10
W.B. ROADWAY
E.B. ROADWAY
EXISTING TOP OF SLOPE
SUBSTATION
SITE
RAMP No. 9
SEMINOLE
AVE.
AVE.
N. OZANAM
N. OZARK AVE.
N. OVERHILL AVE.

FIGURE II-11 LOCATION MAP FOR CANFIELD AVENUE SUBSTATION

In general, the computation of traction power requirements will be made on (1) a maximum condition of train acceleration; (2) the maximum train speeds permitted by curves, grades and signals; (3) the maximum service braking rate; (4) an assumed station stop of 10 seconds; (5) an assumed passenger load of 22,500 pounds per car; and (6) maximum car auxiliary loads of heat or air-conditioning.

Substation traction power would have sufficient potential such that malfunction of one component of the system would have only a minor effect on the ability of trains to operate on their design schedules.

Sufficient auxiliary feeder systems such as gas turbine or standby diesel engine generator sets would be available. These would provide sufficient emergency power for ventilation and pumps (in the airport area) in the event of fire or other accident. Similarly, in the event of public utility electric supply failure, the airport access system would have sufficient emergency power sources to provide low level propulsion power, emergency lighting at the airport terminals, and signal system controls power. (Escalators and air-conditioners, however, would not be powered under such emergency conditions.)

Control System

The CTA's coded audio frequency cab signal system would control the rapid transit extension. Speed commands of 15, 25, 35, 55, and 70 mph would be provided. (The carborne portion of the train control apparatus would be a General Railway Signal Cabmatic II system, or equivalent.)

Fail-safe equipment aboard vehicles would receive and decode audio frequency signals emanating from the running rails and loops. The six-speed commands above would be used as the maximum speed limits

transmitted to trains. When no signal is received by a train from the system, this is interpreted as a stop command by the carborne apparatus, to be followed by a slow proceed movement (15 mph).

Overspeed control protection would also be provided aboard vehicles. Thus, when a train would be exceeding allowable speed, an alarm would be sounded audible to the motorman. He must brake within a specified time period, or the train will be brought to an irretrievable-stop braking action.

Signals and controls for the O'Hare extension would meet all specifications and standards of the Signal and Communication Section, Association of American Railroads.

VEHICLES

Vehicle Characteristics

As the access system is proposed to have two classes of service between O'Hare Airport and Chicago's CBD (these are described in a subsequent section), two types of vehicle requirements are foreseen; differing only in interior accommodations. These differences are described further below.

The following characteristics, however, would be true for both classes of vehicles as they both would meet certain CTA requirements for size and performance.

Typically, the CTA car is 48 feet long, has a 9 foot, 4 inch maximum exterior width, and stands 12 feet high over the rails when empty. (Other

dimensions are indicated in Figure II-12. The car has an aisle headroom of 6 feet 9 inches, and has a maximum empty weight requirement of 48,500 pounds.

Performance

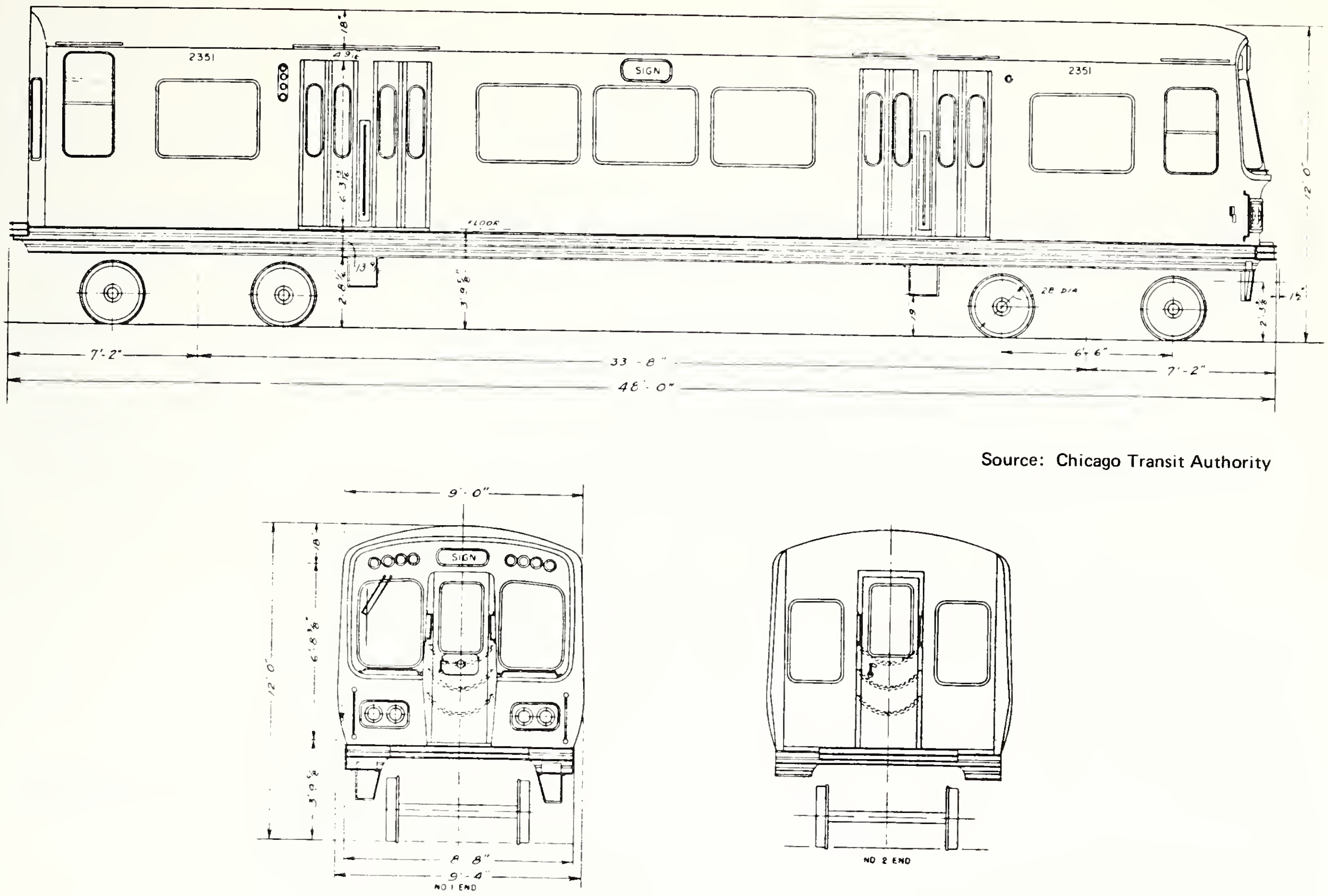
With respect to performance requirements, trains for the airport access system would have a performance capability which is compatible with existing equipment. Thus, a two-car train would accelerate to a speed of 30 mph in no less than 14 seconds, and to 60 mph in no less than 110 seconds on level tangent track, and at a 550 V DC power supply; minimum balance speed, similarly, would be 70 mph. The average maximum acceleration rate and braking rate would be 3.3 mphps. Vehicle run times between the CBD and O'Hare Airport under such performance criteria are estimated below.

Comfort

Control of interior passenger comfort would be regulated by an air-conditioner/heater system. This would regulate temperature and humidity to permit maintenance of interior car temperature over a range of 65 degrees to 75 degrees F, while exterior ambient temperature ranged between 0 degree and 95 degrees F.

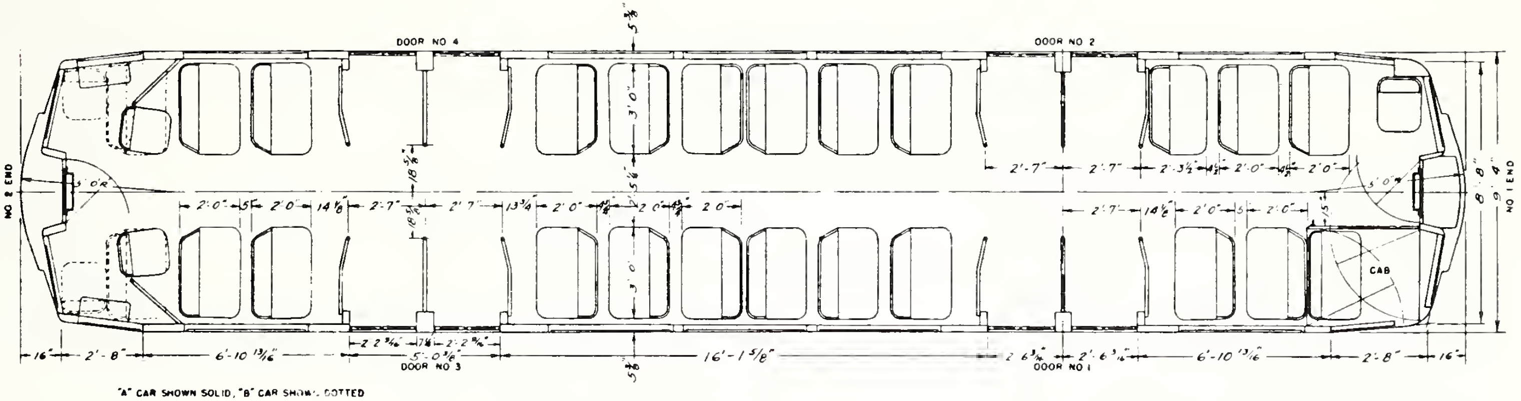
Interiors

As the transit service provided and general operation of the "local" class of access service to O'Hare Airport would be very similar to that currently available on the Milwaukee-Congress-Douglas branch of the CTA, no need is foreseen for departures from conventional vehicle interiors. Figure II-13 indicates a plan view of such an interior. Such a vehicle nominally seats


2351
SIGN
2351
FLOOR
18"
4 9/16
6'3 5/16
2'8 1/16
13 3/4
3'0 5/8"
6"
28 DIA
1 1/2"
2'3 5/8"
12'0"
7'-2"
33'-8"
6'-6"
7'-2"
48'-0"
9'-0"
SIGN
18
6'8 3/8"
12'0"
3'0 5/8"
8'8"
9'-4"
NO 1 END
NO 2 END

Source: Chicago Transit Authority

FIGURE II-12 ACCESS SYSTEM RAPID TRANSIT VEHICLE ELEVATION


DOOR NO 4
DOOR NO 2
DOOR NO 3
DOOR NO 1
NO 2 END
NO 1 END
CAB
8'-8"
9'-4"
16'-1 5/8"
6'-10 13/16"
2'-8"
16"
2'-7"
2'-0"
3'-0"
5'-0"
"A" CAR SHOWN SOLID, "B" CAR SHOWN DOTTED

Source: Chicago Transit Authority

FIGURE II-13 PLAN VIEW - CONVENTIONAL VEHICLE FOR LOCAL SERVICE

45 persons, and typically may have a crush load of over 100 passengers. No racks, bins, or special compartments are provided for luggage.

As will be described below, it is expected that passengers traveling between O'Hare Airport and Chicago's CBD on-board the additional class of service -- the "premium fare service" -- would be carrying suitcases, packages, and the like. Hence, compartments would be suitably located near car doors, in place of some seats in the vehicles which would be used for the premium fare service. Such compartments may require 100 cubic feet in each car; a typical arrangement for such bins is shown in Figure II-14, as are proposed changes to seating accommodations.

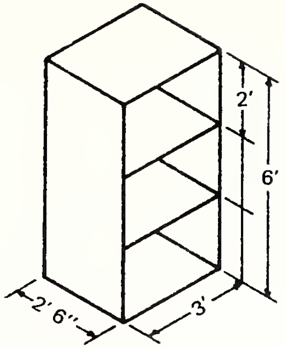
An increased number of facing seats would permit more convenient communications between family groups, business travelers, and other persons traveling together.

Such premium fare vehicles would also have a higher level of passenger amenities on board, including additional insulation to permit conversation at high speeds, possibly rug-covered flooring, and general selection of seats, colors, and materials suggestive of airplane interiors so as to attract the business traveler who can afford a taxi or private automobile alternative.

SYSTEM OPERATIONS

"Local Service" Alternatives

As presently conceived, access to O'Hare Airport from the CBD would be possible via two separate classes of rapid transit transportation: a "local" system, and a "premium fare" system. Each class would make stops at all downtown (Dearborn Subway) stations, and both classes would use the same track system enroute to the airport.



TYPICAL LUGGAGE BIN DETAIL

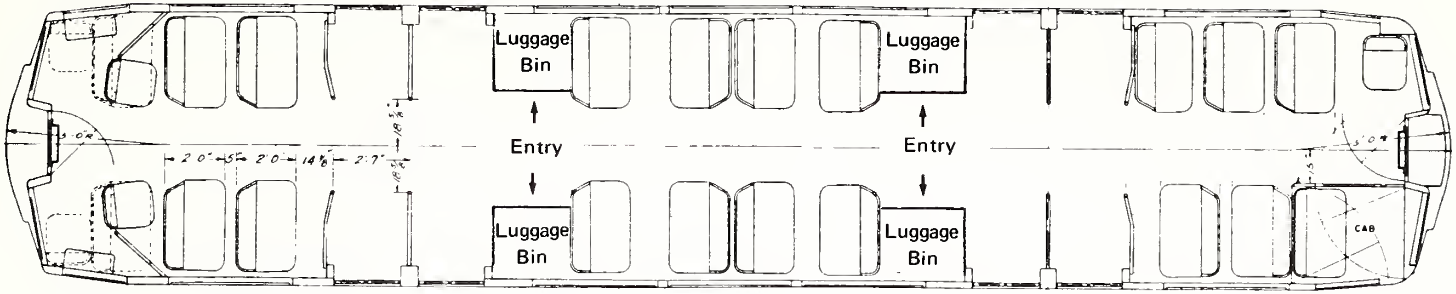

Luggage Bin
Luggage Bin
Entry
Entry
Luggage Bin
Luggage Bin
CAB
2'0"
5
2'0"
14⅝"
2'7"
5'0"
5'0"

FIGURE II-14 PROPOSED VEHICLE INTERIOR CHANGES - PREMIUM FARE SERVICE

As the local system would simply be an extension of existing service beyond Jefferson Park, it would continue to use conventional cars, and would continue to have patterned service, i.e., "A" and "B" stops. The analyses performed in Volume I of this report[1] assumed a total fare of $.70 (1972-1973 dollars) for a trip between CBD and airport. Such a system is highly oriented to providing direct airport service for airport employees, 52 percent of whom are likely to board or transfer at downtown stations, thereby riding nearly the full length of the entire access system.

Alternative operating schemes include the following:

- Local trains would continue to operate the present A-B service to intermediate stations up to Jefferson Park; Jefferson Park would remain an A-B station; one of the planned stations between Jefferson Park and the airport to become an "A" station, while the other would become a "B" station; and the airport itself would become an A-B station.
- Instead of all local trains ultimately traveling to the airport, only every second or third train would be so operated, all other local service trains being reversed at River Road. Such an alternative would limit the need for a larger quantity of new vehicles. In fact, in the initial period following opening of the extension, only such limited service may be needed at first.
- Run local shuttle service between Jefferson Park and the airport. This would require that all local passengers transfer at Jefferson Park. Such an arrangement would provide for high flexibility in orienting the level of service provided in the two segments, CBD-Jefferson Park, and Jefferson Park-O'Hare Airport.

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[1] Please refer to page 79 for a discussion of fares for local service to the airport.

In general, the distribution of local service trains coming from the Jefferson Park/airport area in the CBD could continue very much as at present. Thus, "A" trains would continue to make all stops on the Congress Service branch west of the CBD, and "B" trains would make all stops on the Douglas Service branch (shown in Figure I-1).

Local airport trains could either become Congress or Douglas trains inbound from the airport, or terminate and be reversed at the third (center) track available in the vicinity of Morgan Street (see reference again in Figure I-1). In such case, the final CBD stop would be Halsted Street, an A-B station.

Premium Fare Operations

In Volume I of this report a range of fares was examined and analyzed for the premium fare system. The revenue maximizing fare was determined to be $1.60 for a one-way trip between the CBD and O'Hare Airport.

The purpose of the premium fare system is to offer a special and high caliber of transportation oriented to attract the air passenger, who typically chooses taxi, limousine, or car rental. Hence, this system's conception has attempted to be consistent with this goal.

In order to offer a high degree of comfort and perceived security, and in order to minimize fare collection complication, it is recommended that the last stop, in the airport bound direction for this service, be Lake Transfer. From this point, premium fare service would run non-stop to O'Hare Airport. It is believed that the advantages obtained from such an operating policy would outweigh the disadvantages, as relatively few air passengers would tend to use the access system from Jefferson Park station, or from any of the intermediate stations. Further, for those air passengers who do, the local service access system would be available.

Air passengers using the premium fare system would pay premium fares at fare collection booths when entering the CTA system. Passengers would receive a receipt or other form of fare payment confirmation. Once enroute heading for the airport and past Lake Transfer, either the receipt or the difference between local airport service fares and premium fares would be collected by the on-board train attendant.

As the train would make no stops enroute to the airport, and as the run-time from Lake Transfer to O'Hare is on the order of one-half hour, this method of fare collection should pose little problem to the train attendant.

Similarly, in the reverse direction, at airport fare collection facilities, passengers would pay the premium fares, receive a receipt, board vehicles, and surrender either the receipt or the difference between full premium fare and regular fare for local airport service.

In the CBD, Halsted station would be the terminal station for premium fare service operations. Trains would be reversed and would have scheduled layovers on the third track available just beyond Morgan Street.

Optimum development of the premium fare service will require that it be provided during all hours in which local service is in operation. (It is on this basis of 20-hour daily operation that the operating costs have been estimated in this report.) However, it is reasonable to consider that something less than full 20-hour operation may be appropriate during the initial period of operation. Certainly premium fare service must be provided in all periods of high usage of local service, indicating that a reduced schedule would probably include at least eight hours of service as a minimum. A possible alternative to full premium fare service would be the addition of one or more premium fare type cars to all local trains destined to the airport.

Staging and Implementation

Throughout this study the Technical Advisory Committee and the Consultant have felt that premium service would be necessary to attract air passengers to a CBD-O'Hare rail facility. However, this is a hypothesis which is not proven for the O'Hare situation. Therefore, it is suggested that consideration be given to a staged program for development of the premium service. This program would include:

- Initiation of service to O'Hare using local service trains at regular fares.
- A controlled series of experiments in increasing service quality and amenities for air passengers. (This would include special loading areas on the Loop, baggage space on cars, exclusive use of cars in certain periods, etc.)
- A closely related series of experiments in use of premium fares in order to ascertain an appropriate relationship of service amenities to user charges.

The experimental program would lead to the adoption of a permanent service providing an acceptable level of service to air passengers.

SYSTEM TERMINAL DESIGN ASPECTS

Terminal Plan

The proposed rapid transit access system enters O'Hare Airport via the access highway from the east and loops counter-clockwise around the three airport terminals. It then reconnects with the access road (see Figure II-15). A rapid transit train entering the airport area would make stops at each of the three terminal platforms.

The airport is planned to contain two future transportation and distribution systems in addition to rapid transit access, and the access system planning has attempted to integrate all three systems.[1]

The two other future systems at O'Hare Airport include an intra-airport (IA) system, and a passenger distribution system (PDS).[2] The technology of the IA will be similar to that of the CTA's rapid transit, in that IA vehicles, although shorter, will be compatible with the power supply, signal controls, and track gauge of the access system. Thus, both systems could share the track within a single tunnel (see detail, Figure II-16).

The PDS system will provide passenger circulation among the three terminals; its exact characteristics have not been established at this time. Profiles of the systems in the airport plan are shown in Figure II-17.

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[1] Primary planning for this concept has been developed by the Bureau of Engineering, Department of Public Works.

[2] The proposed CTA extension is not dependent on the existence of any future intra-airport systems.

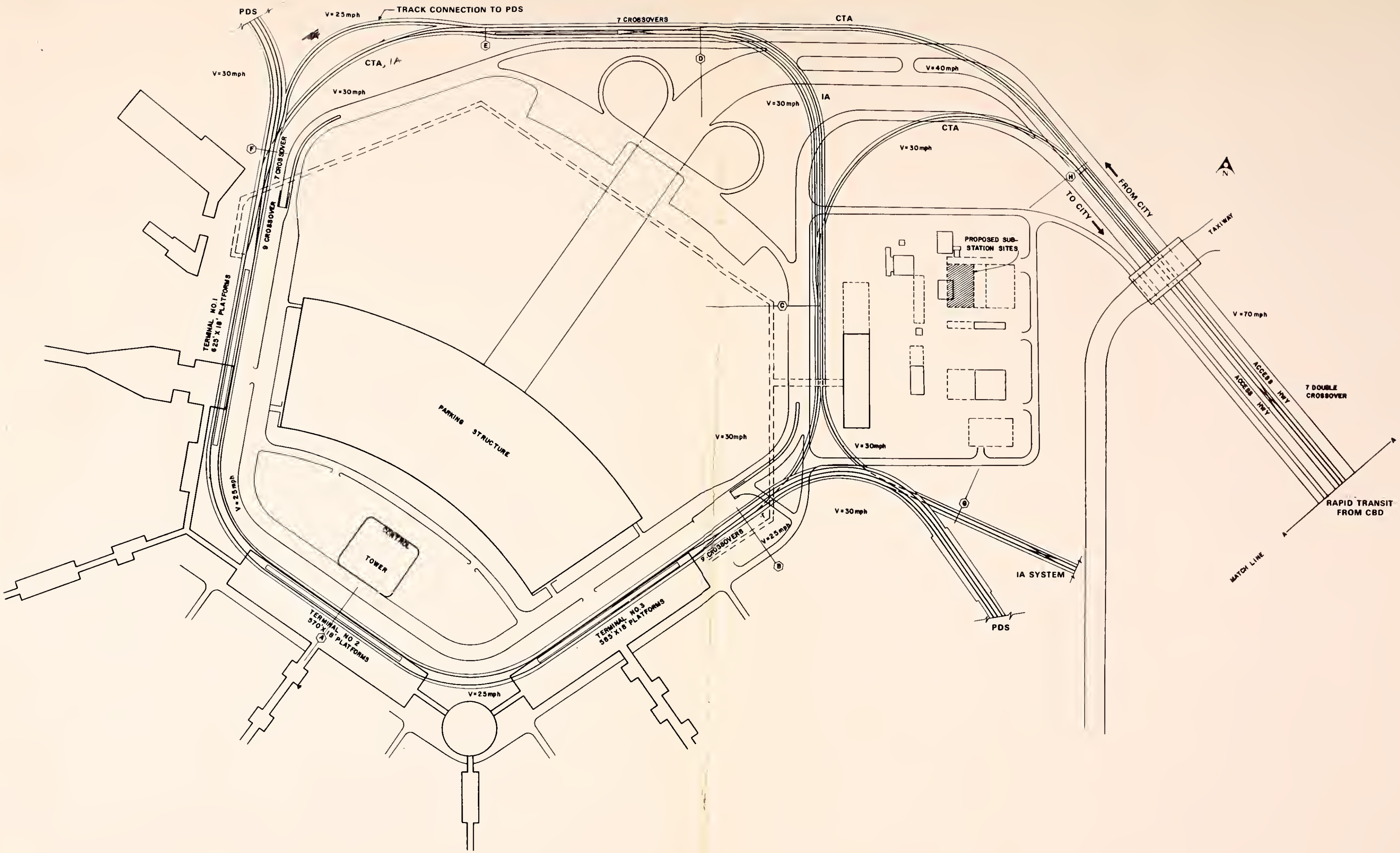
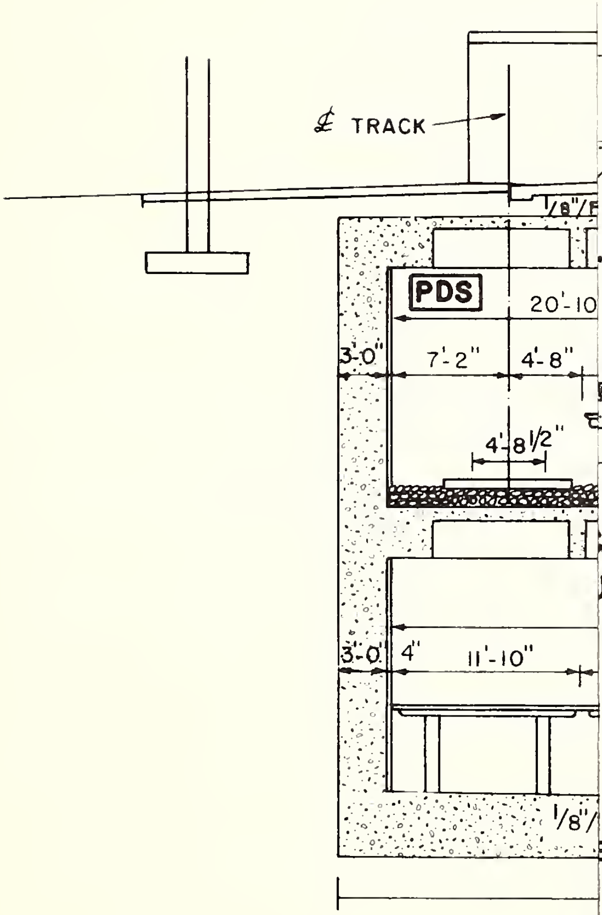
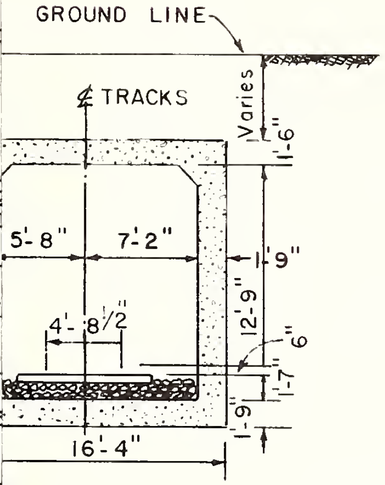

PDS
V=25mph
TRACK CONNECTION TO PDS
7 CROSSOVERS
CTA
CTA, IA
V=30mph
V=30mph
E
D
IA
V=30mph
V=40mph
CTA
V=30mph
F
7 CROSSOVER
9 CROSSOVER
H
FROM CITY
TO CITY
N
TAXIWAY
PROPOSED SUB-STATION SITES
TERMINAL NO.1
625'X18' PLATFORMS
C
V=70mph
ACCESS HWY
ACCESS HWY
7 DOUBLE CROSSOVER
PARKING STRUCTURE
V=30mph
V=30mph
A
V=25mph
CONTROL TOWER
9 CROSSOVERS
V=25mph
B
G
V=30mph
RAPID TRANSIT FROM CBD
A
MATCH LINE
IA SYSTEM
PDS
TERMINAL NO.2
570'X18' PLATFORMS
A
TERMINAL NO.3
565'X18' PLATFORMS
V=25mph

FIGURE II-15 O'HARE AIRPORT LAYOUT AND ACCESS SYSTEM LOOP



℄ TRACK
1/8"/F
PDS
20'-10
3'-0"
7'-2"
4'-8"
4'-8 1/2"
3'-0"
4"
11'-10"
1/8"/



GROUND LINE
℄ TRACKS
Varies
1'-6"
5'-8"
7'-2"
1'-9"
4'-8 1/2"
12'-9"
6"
1'-7"
1'-9"
16'-4"

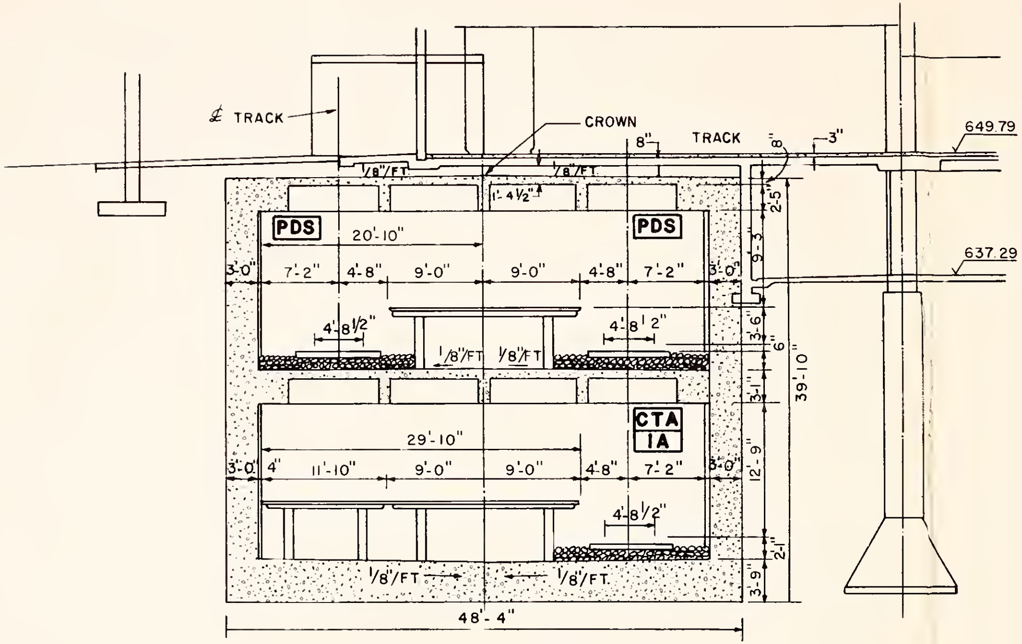
AL SINGLE TRACK
NNEL SECTION

ENSIONS SHOWN ARE FOR TANGENT

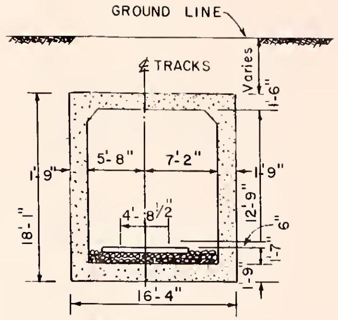
L DIMENSION WILL VARY DEPENDING

N.

TYPICAL SE


℄ TRACK
CROWN
TRACK
8"
8"
3"
649.79
637.29
1/8"/FT
1/8"/FT
1'-4½"
PDS
PDS
20'-10"
3'-0"
7'-2"
4'-8"
9'-0"
9'-0"
4'-8"
7'-2"
3'-0"
2'-5"
9'-3"
4'-8½"
4'-8 1 2"
1/8"/FT
1/8"/FT
3'-6"
6"
39'-10"
3'-1"
CTA
1A
29'-10"
3'-0"
4"
11'-10"
9'-0"
9'-0"
4'-8"
7'-2"
3'-0"
12'-9"
4'-8½"
2'-1"
3'-9"
1/8"/FT
1/8"/FT
48'-4"

TYPICAL SECTION AT TERMINAL T-2 &3


GROUND LINE
℄ TRACKS
Varies
1'-6"
1'-9"
5'-8"
7'-2"
1'-9"
18'-1"
4'-8½"
12'-9"
6"
1'-7"
1'-9"
16'-4"

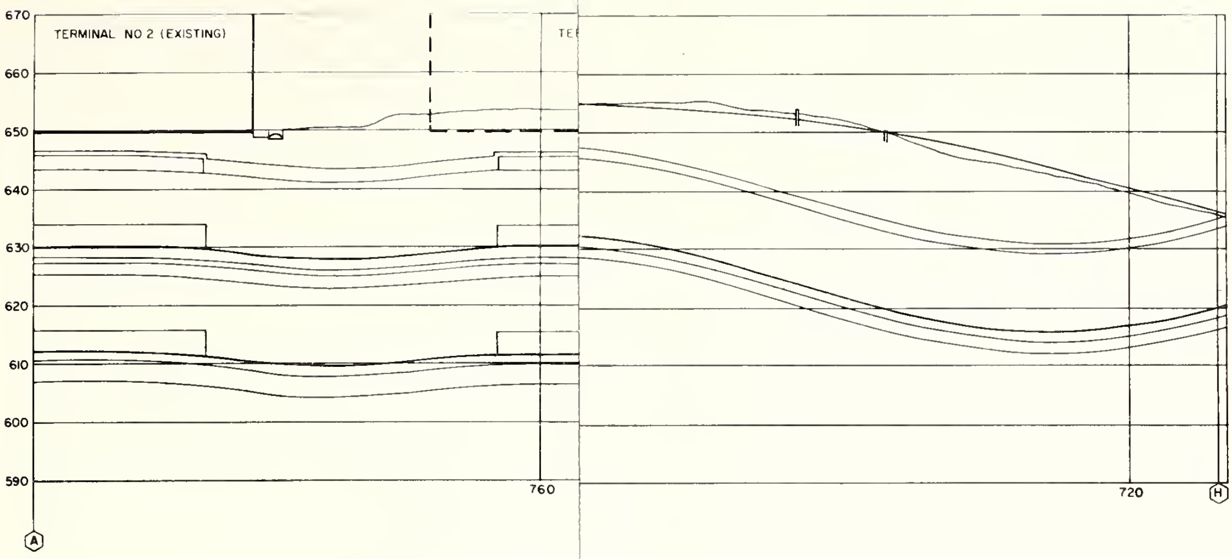
TYPICAL SINGLE TRACK TUNNEL SECTION

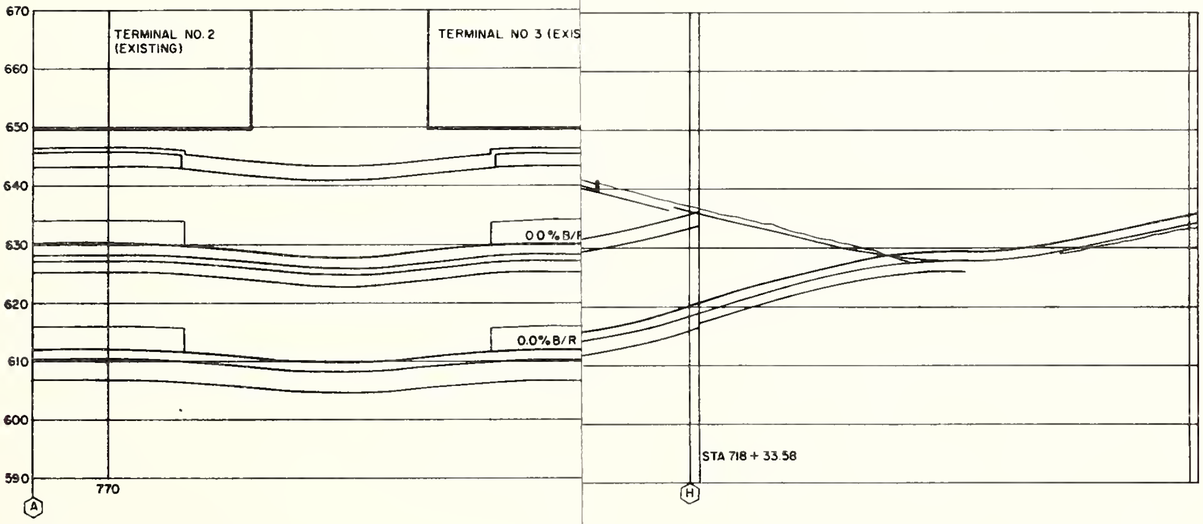
NOTE:

TUNNEL DIMENSIONS SHOWN ARE FOR TANGENT SECTION.

STRUCTURAL DIMENSION WILL VARY DEPENDING ON LOCATION.

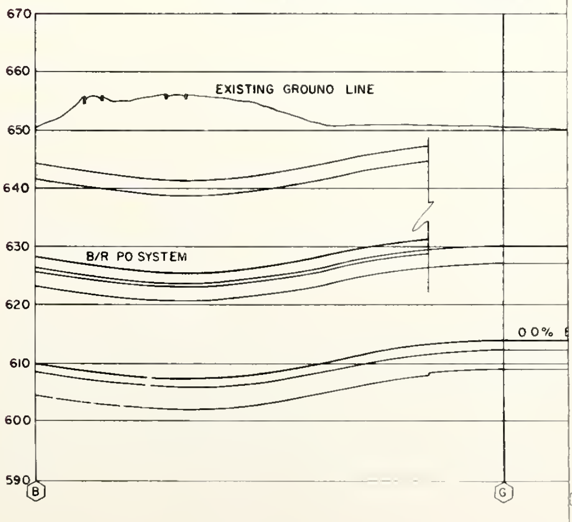
FIGURE II-16 ACCESS SYSTEM-O'HARE TUNNELS

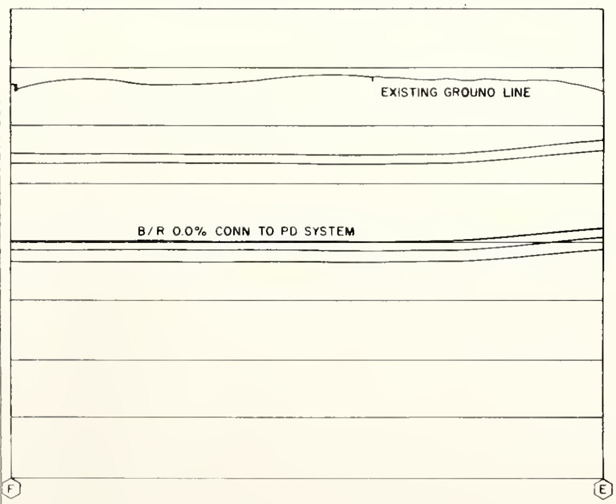

670
660
650
640
630
620
610
600
590
TERMINAL NO 2 (EXISTING)
TE
760
720
A
H

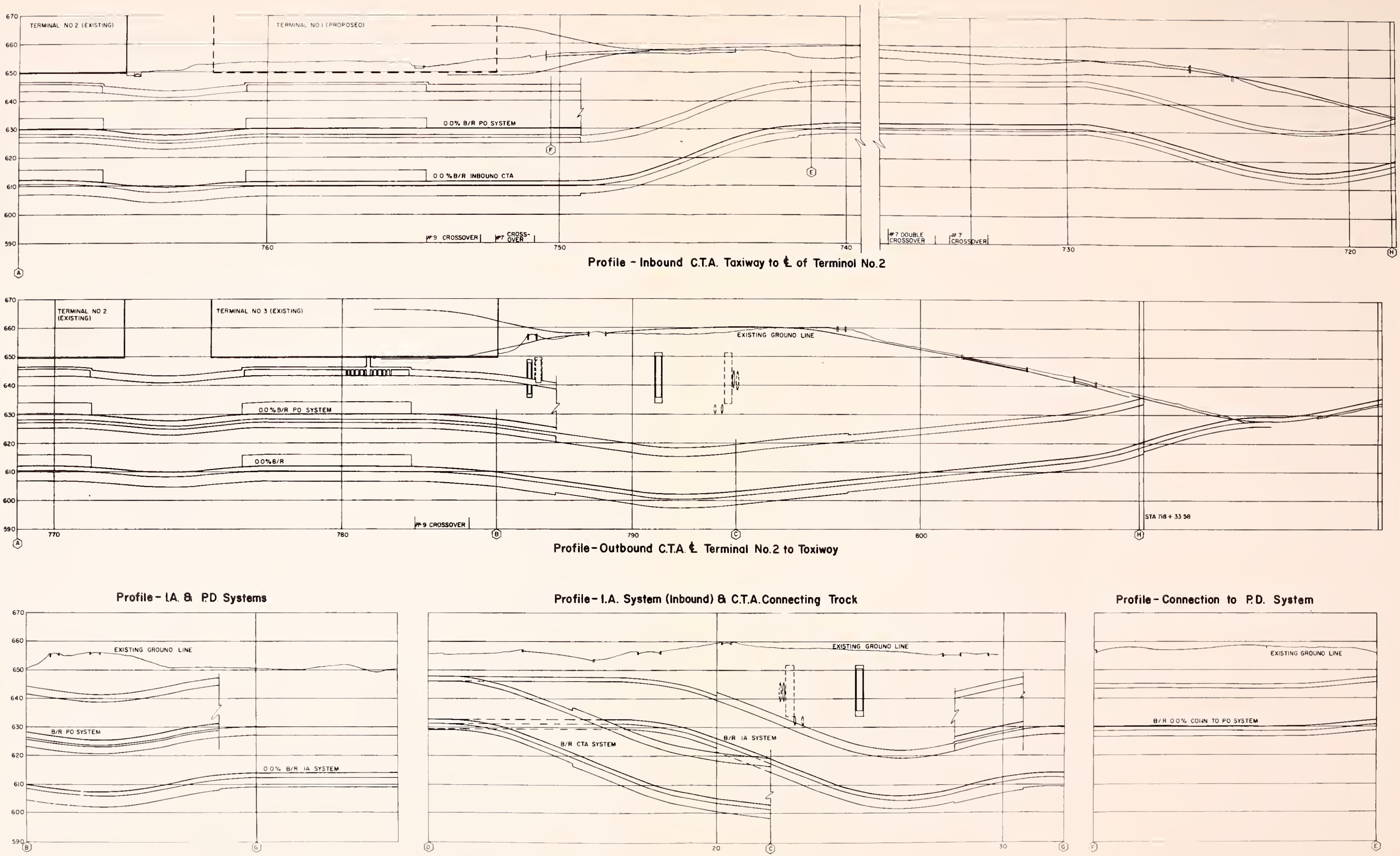

670
660
650
640
630
620
610
600
590
TERMINAL NO. 2 (EXISTING)
TERMINAL NO 3 (EXIS
0.0% B/R
0.0% B/R
STA 718 + 33.58
770
A
H

Profile - I.A. & P.D. Systems

Profile - Connection to P.D. System


670
660
650
640
630
620
610
600
590
EXISTING GROUND LINE
B/R PD SYSTEM
0.0%
B
G


EXISTING GROUND LINE
B/R 0.0% CONN TO PD SYSTEM
F
E


Profile - Inbound C.T.A. Taxiway to ℄ of Terminal No.2

Profile - Outbound C.T.A. ℄ Terminal No.2 to Taxiway

Profile - I.A. & P.D. Systems

Profile - I.A. System (Inbound) & C.T.A. Connecting Track

Profile - Connection to P.D. System

TERMINAL NO 2 (EXISTING)
TERMINAL NO 1 (PROPOSED)
0.0% B/R PD SYSTEM
0.0% B/R INBOUND CTA
#9 CROSSOVER
#7 CROSS-OVER
#7 DOUBLE CROSSOVER
#7 CROSSOVER
TERMINAL NO 3 (EXISTING)
EXISTING GROUND LINE
0.0% B/R PD SYSTEM
0.0% B/R
STA 718 + 33.58
B/R PD SYSTEM
0.0% B/R IA SYSTEM
B/R CTA SYSTEM
B/R IA SYSTEM
B/R 0.0% CONN TO PD SYSTEM
670
660
650
640
630
620
610
600
590
770
780
790
800
760
750
740
730
720
20
30
A
B
C
D
E
F
G
H

FIGURE II - 17 PROFILES OF AIRPORT LOOP

When a rapid transit train enters the airport area and stops at a platform, passengers will be at the lowest level of a multi-level stack of transportation systems. IA vehicles would be available at the same level; these, for example, could take passengers to the future International Terminal northeast of the existing terminal areas. Passengers desiring use of the PDS system would travel via elevators and passageways to the next higher level. Those passengers who are at their proper location would travel further upward via escalators to the existing airport terminal areas (see Figure II-18).

Although planned in an exceedingly constricted location, due to the proximity of elevated roadways and existing structures at the airport, the three station platforms, measuring 625 feet, 570 feet, and 585 feet in length, and commonly 18 feet in width, should provide adequate area for passenger circulation.

As layovers and schedule correction are planned at the Morgan Street track area, trains leaving from Terminal 3 at the airport would continue directly inbound toward the CBD.

Baggage Handling

Although no baggage handling facility or system is presently under consideration, in the event that a potential Distributor System connection in the CBD became a reality, and a true CBD terminal were developed, airlines may conceivably wish to undertake baggage checking in the CBD terminal. This would require a mechanism whereby checked baggage could be removed from the vehicles, deposited in a vertically oriented system at or near the station platforms, and re-deposited at the appropriate airline's baggage sorting system at the airport. The prospects of such a facility are further discussed in a subsequent section.

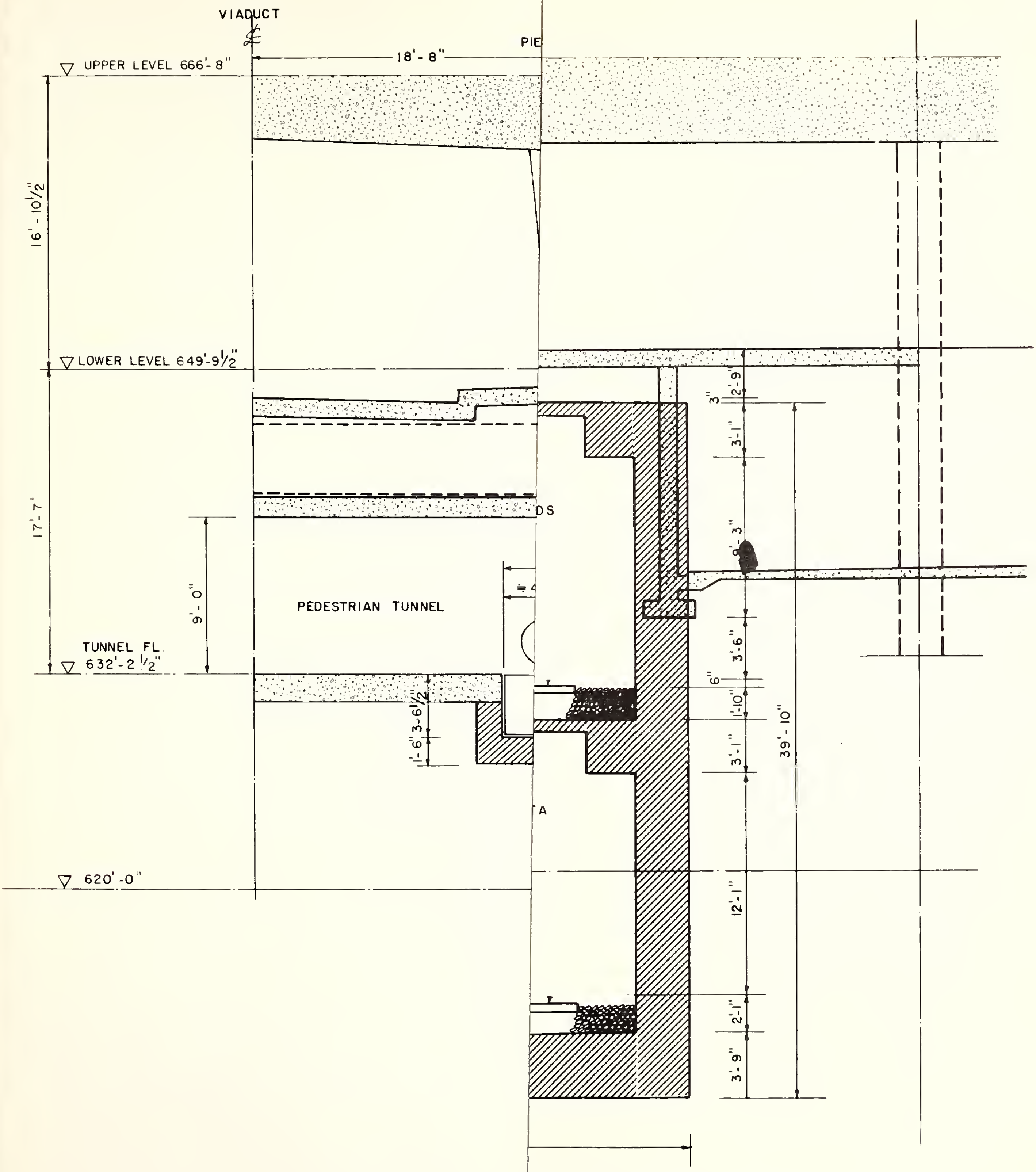
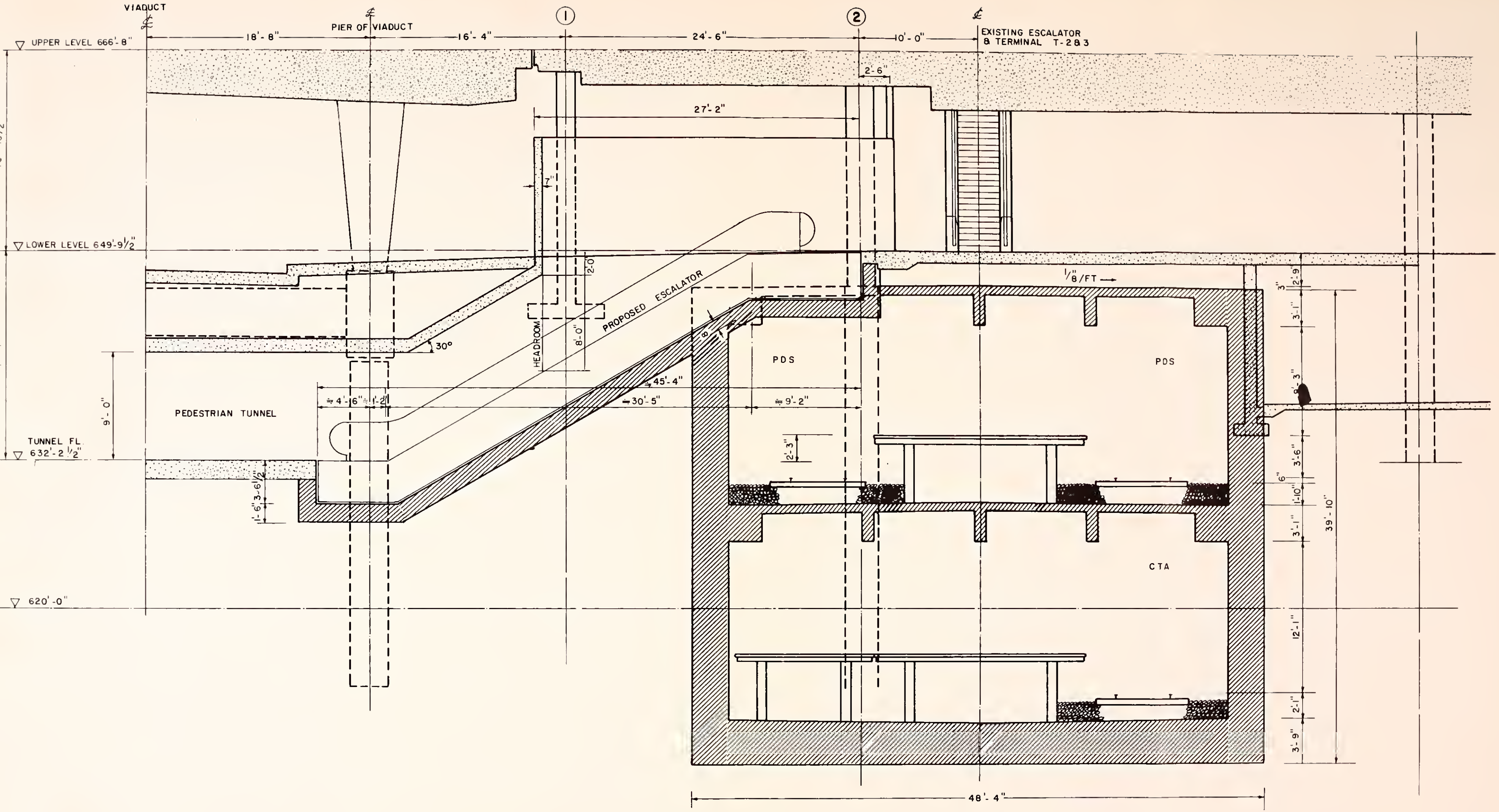

VIADUCT
℄
PIE
18'- 8"
UPPER LEVEL 666'- 8"
16'- 10½"
LOWER LEVEL 649'-9½"
17'- 7"
9'- 0"
PEDESTRIAN TUNNEL
TUNNEL FL.
632'- 2½"
620'- 0"
DS
TA
4
3'-6½"
1'-6"
3"
2'-9"
3'-1"
2'-3"
3'-6"
6"
1'-10"
3'-1"
39'- 10"
12'-1"
2'-1"
3'-9"

FIGURE II-18 ACCESS S CE/EGRESS DETAIL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EXISTING ESCALATOR & TERMINAL T-283
UPPER LEVEL 666'-8"
18'-8"
16'-4"
24'-6"
10'-0"
2'-6"
27'-2"
7"
LOWER LEVEL 649'-9 1/2"
2'-0
1/8"/FT
30°
HEADROOM
8'-0"
PROPOSED ESCALATOR
8"
PDS
PDS
45'-4"
4'-6"
1'-2"
30'-5"
9'-2"
9'-0"
PEDESTRIAN TUNNEL
TUNNEL FL. 632'-2 1/2"
2'-3"
1'-6"
3'-6 1/2"
3"
2'-9
3'-1"
9'-3"
3'-6"
6"
1'-10"
3'-1"
39'-10"
CTA
620'-0"
12'-1"
2'-1"
3'-9"
48'-4"

FIGURE II-18 ACCESS SYSTEM TYPICAL AIRPORT CROSS SECTION AND PASSENGER ENTRANCE/EGRESS DETAIL

At present, passengers alighting from the rapid transit system at the airport would carry their bags to the elevators and thence to conventional baggage checking facilities there. It is conceivable that a "red-cap" service may thus be useful, either offering aid and assistance at the station platform, or near the top of escalators, for airport-bound passengers. In any event, escalator widths should be designed accordingly.

CBD TERMINALS

As presently conceived, since space is quite confined in the CBD stations along the Dearborn Subway, only limited improvements may be possible to accommodate airport oriented passengers.

Turnstiles should be modified or redesigned to admit easily a passenger with luggage in hand. Special signing should be evident at the street level entrance. An appropriate CBD station -- such as Jackson -- should be designated as the downtown access system terminus (although, in fact, all CBD stations would permit entry to the premium and local service trains).

Such a station would have convenient taxi access, and have certain improvements such as wide stairs, or the installation of special elevators, to attract additional potential passengers. Conceivably, in the final design stage, consideration could be given to the utilization of the unused areas on the Dearborn Street platform.

Certain amenities can be installed, however, to ease this situation. Special baggage facilities aboard the vehicles have already been discussed. An elevator, if at all feasible, should be installed at the designated CBD system terminus, and escalators should be installed from the sidewalk level to the mezzanine. Escalators, elevators, and passenger-ways should be of adequate width to admit both a passenger and carried luggage. As has been mentioned, passenger turnstiles would require some modification whereby a passenger could easily pass through a fare accepting mechanism. And, finally, thought may need to be given to widening vehicle doors, or removing the center pillar, on premium fare vehicles, to create a full double door-width opening to admit passengers conveniently.

Mail Handling Potential

As with baggage handling, the mail cargo potential for the airport access system has inherent problems. There are obvious needs for large-scale volume transfers of mail from the CBD to the airport.

At least two problems arise with respect to an on-line access system. The transshipment need in the CBD to the appropriate downtown station from the central mail office still exists. Presumably, this may possibly be overcome through a series of conveyor belts or other devices which may directly connect a post office with such a CBD station.

However, questions exist concerning the existence of such a possible location in the Dearborn Subway. Further, the potential effect on dwell time during regular business hours is still extreme and prohibitive.

In the absence of an off-line terminal, both volume baggage and mail handling potential appears slight.

Distributor Connection

As has been described in Volume I of this report, the consultants regard the potential for improved distribution of passengers in the CBD via a possible Distributor System connection as considerable.

In similar manner, such a connection with the planned Distributor also provides considerable potential for an off-line terminal for the airport access system in several locations (such as the Prudential Center). Such a facility, appropriately planned for full integration with other passenger requirements, could indeed incorporate volume mail and baggage handling capabilities.

Although the O'Hare baggage removal problems still exist, dwell-time would no longer create insurmountable difficulties for such an off-line terminal. All mail handling, accomplished late at night, would also not interfere with normal system operation during regular business hours,

SUPPORT SYSTEMS

In addition to the elements of the access system thus far described, the system plan includes full support facilities related to the needs of rapid transit transportation.

The present maintenance shop located just beyond Jefferson Park station would be removed and replaced by a much more comprehensive maintenance facility at the station planned near River Road. This new facility would contain five tracks, measure 110 feet by 225 feet, and thus have capacity for 16 vehicles.

As this station would be a major activity center for CTA employees, an employee parking lot would be included, with 85-car capacity.

West of the maintenance shop, a major, 15-track storage yard would be constructed, capable of holding over 200 vehicles.

A transportation office building with control tower for yard and switch operations would also be included in the complex. (These facilities are shown in Figure II-6.)

ACCESS SYSTEM COSTS

Construction Estimate

An estimate of construction costs for the proposed access system is provided in Table II-1. Appropriate allowances are made for portions of the airport terminal plan, although other systems may use common facilities. Allowances are also included for intermediate stations, and for parking, support, and other facilities. Costs have been escalated to 1974 dollars.

Revenues and Operating Costs

In depicting projections for system revenues and operating costs, a 1976 system start-up date has been assumed (see Table II-2). Escalation and other factors and assumptions have been used for both fares and costs, as described in notes on the calculation basis, Table II-3.

As indicated in Table II-2, anticipated direct user revenues do not meet estimated operating costs in the period between assumed system start-up -- 1976 -- and the design (30 million enplanements) year -- 1983. The projected resultant annual operational deficit ranges from $672,000 in 1976 to over $2,200,000 in 1983. Thus, sources of operating revenues other than access system users must be identified through local policy action to meet this differential.

TABLE II-1

RECOMMENDED O'HARE ACCESS SYSTEM
CONSTRUCTION COST ESTIMATE
CTA EXTENSION, JEFFERSON PARK-O'HARE AIRPORT

	1970 Dollars*	
Civil ROW Work		
Bridges	$ 2,543,000	
Tunnels and Associated Misc.	18,153,000	
Grading and Walls	3,739,000	
Track and Track Work	6,021,000	
Miscellaneous	445,000	
		$30,901,000
Station Construction		
Airport Station Work	$ 2,897,000	
Intermediate Stations & Parking	14,626,000	
Station Terminal Facilities	4,803,000	
		$22,326,000
Power and Electrification		
Substations	$ 1,995,000	
Electrification	2,470,000	
		$ 4,465,000
Signals and Controls		
Signal System	$ 2,614,000	
Communication System	1,313,000	
		$ 3,927,000
Allowance for Airport Systems' Vehicle Storage and Maintenance Facilities		($ 1,240,000)
Engineering Contingency		$ 9,121,000
Sub-Total		$69,500,000
Escalation to Bring to 1974 Estimate		22,935,000
TOTAL		$92,435,000

*Figures are based on estimate provided by Bureau of Engineering, City of Chicago DPW.

TABLE II-2

PROJECTED ANNUAL REVENUES AND COSTS RECOMMENDED O'HARE ACCESS SYSTEM

	1976	1977	1978	1979	1980	1981	1982	1983
REVENUES*								
Premium Service Revenues	$ 6,715,000	$ 7,297,000	$ 7,932,000	$ 8,621,000	$ 9,367,000	$10,133,000	$10,958,000	$11,852,000
Local Service Revenues	4,592,000	4,984,000	5,409,000	5,870,000	6,370,000	6,906,000	7,487,000	8,124,000
Total Revenue	$11,307,000	$12,281,000	$13,341,000	$14,491,000	$15,737,000	$17,039,000	$18,445,000	$19,976,000
OPERATING COSTS*								
Premium Service Costs	$ 6,811,000	$ 7,491,000	$ 8,251,000	$ 8,964,000	$ 9,856,000	$10,692,000	$11,601,000	$12,600,000
Local Service Costs	5,168,000	5,678,000	6,233,000	6,773,000	7,441,000	8,092,000	8,799,000	9,587,000
Total Operating Costs	$11,979,000	$13,169,000	$14,484,000	$15,737,000	$17,297,000	$18,784,000	$20,400,000	$22,187,000

*See explanatory notes, Table II-3.

TABLE II-3

RECOMMENDED O'HARE ACCESS SYSTEM PROJECTIONS OF REVENUES AND COSTS BASIS FOR ANALYSIS

REVENUES

1. It is deemed reasonable to assume that the growth rate of premium service patronage (air passengers and travel related visitors) will be approximately equal to that of overall O'Hare enplanement growth rate. O'Hare enplanement growth rate is estimated by industry to be between 5 percent and 6 percent annually for the near term However, ATA macro enplanement forecasts for the entire industry show a decline in the period 1980-1985. In view of this, O'Hare access system premium service patronage growth rate is estimated to be as follows:

   1976-1980 - 5 percent annually
   1980-1983 - 4.5 percent annually

2. Based on the fare sensitivity analysis described in Volume I of this report, the premium service fare selected is that which maximizes annual revenues, $1.60. As this analysis was performed in 1972 dollars, and as the period for absolute system revenue projection is 1976 (assumed system start-up) to 1983 (design year), a 3.5 percent annual fare increase was deemed appropriate. Thus, for calculation purposes, the assumed fare for 1976 is approximately $1.84, being increased to a 1983 level of approximately $2.34.

3. The assumption has been made that the growth rate of airport employees using the local service access system will be approximately equal to the overall growth rate of employees at O'Hare Airport. In Volume I of this report, an analysis was provided to project a 31,000 airport employee level in 1983. Based on (a) the assumed continued increase in employee productivity, (b) the present number of airport employees, and (c) the attainment of the predicted 30 million enplanements at O'Hare Airport by 1983,[1] the linear annual growth rate of airport employees is 4.6 percent.

4. The growth rate of casual visitors employing the local service airport access system has been assumed to be approximately equal to that of airport passenger growth, i.e., 1976 to 1980 -- 5 percent annually, and 1980 to 1983 -- 4.5 percent annually.

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[1] Landrum and Brown, Inc., Airport Layout Plan Report for Chicago O'Hare International Airport, 1971.

TABLE II-3 (Continued)

5. A 5 percent annual growth rate is assumed for non-airport oriented passengers using the local service access system.

6. The 1983 (design year) patronage level for all classes of access system users has been taken from Volume I of this report, Table V-14.

7. As with the premium service fare, a 3.5 percent annual increase in fares charged to local service users of the access system is assumed. Thus in 1976, the local one-way fare would be approximately \$.80, and in 1983 it would have increased to slightly over \$1.00.

OPERATING COSTS

1. The calculation basis for quantifying access system operational and car-fleet requirements for the design year have been given in Volume I, Appendix F, Operating Cost Analysis - Allowances, Assumptions, and Basis for Calculation.

2. Operating requirements (and associated costs) to serve the estimated patronage on both premium and local services of the access system for any given year, is based on the proportion of design year patronage which is projected to utilize the system for that year. A small cost factor has been added to account for the imperfect relationship between patronage growth and car-mile growth prior to the design year, where both stand at 100 percent of projected estimate. Thus, operating costs for the start-up year (1976) are projected at 76.1 percent of design year costs for the premium service, and 75.9 percent of the design year for the local service.

3. An overall annual cost escalation factor of 5 percent has been assumed, beginning with the 1972 dollar projection for total system operating costs which was made in Volume I of this report.

A comparison of per user deficit for (1) the proposed extension and (2) the present CTA rapid transit system has been made.

In calendar year 1972, the CTA rapid transit system collected a total of $48,851,622[1] in passenger revenue,[2] and expended $74,762,175[1] in operating expenses, serving 133,620,707[1] revenue passengers in its rapid transit operations. This results in a 1972 annual per-revenue-passenger deficit of 19.4 cents.

Concerning the proposed O'Hare access system extension for the 1983 design year, passenger revenue is projected to be $19,976,000, with operating costs estimated to be $22,187,000. The resultant $2,211,000 deficit would be spread among 13,030,500 new revenue passengers.[3]

Thus, in 1983, the access system extension is projected to have an annual per-revenue-passenger deficit of 17.0 cents.

Considering the historical increase of operating deficits in public transportation systems, and unavoidable increases in future operating costs for the nine or ten years under discussion, on a unit basis, the deficit projection for the access extension appears quite favorable even when compared with current operating statistics.

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[1] CTA statistics.

[2] Includes $492,425 student subsidy, State of Illinois.

[3] See Volume I for categories of passenger estimates.

ENVIRONMENTAL CONSIDERATIONS

As the implementation of the proposed project plan is advanced, the effects on the environment must be specifically identified. Section 102(2)(C) of the National Environmental Policy Act (NEPA) requires that for any proposed Federal action significantly affecting the environment, a detailed statement be submitted which analyzes the environmental impact of the action, any adverse environmental effects which cannot be avoided, alternatives to the proposed action, the relationship of short-term and long-term effects, and any irreversible effects of the action. Additionally, Section 4(f) of the Department of Transportation Act requires corresponding consideration of any effect on or use of public lands.

The Council on Environmental Quality (CEQ) on August 1, 1973, issued final revised guidelines for the preparation of environmental impact statements by Federal agencies. Significant items included are:

- Statements should be prepared late enough in the development process to include meaningful information, but early enough so as not to preclude input into the decision-making process.
- The guidelines encourage public participation in the impact statement process, including the devising of methods to publicize draft statements.
- Statements must discuss the relationship of the proposed project to plans, policies, and controls in the affected area.
- Statements should include "an indication of what other interests and consideration of Federal policy are thought to offset the adverse environmental effect" of the proposed project.
- If a Federal agency determines that a particular project or action does not require the preparation of an impact statement, the guidelines require the agency to prepare for public availability its reasons for such a determination.

Much of the work in Phases II and III of this study will provide input to preparation of an environmental impact statement. This includes, in particular, the identification and evaluation of alternatives, and the assessment of impact on existing mass transportation facilities and services.

Impact Elements

The following impact areas are those which should be considered in determining the impact of a major transportation facility:

- Effect on Transit Service
- Transportation Benefits
- Residential Relocation
    - Households displaced
- Community Economic Impact
    - Business relocation
    - Jobs displaced
    - Tax loss
    - Construction disruption
    - Development opportunities
- Community Quality Impact
- Landscape and Open Space Impact
    - 4(f) areas directly and indirectly affected
- Noise Impact
    - Measurement and standards
    - Exposure
- Air Pollution Impact
    - People affected by pollutants such as carbon monoxide and oxidants
- Standards
- Ecological Impact
- Water Quality and Solid Waste Effects

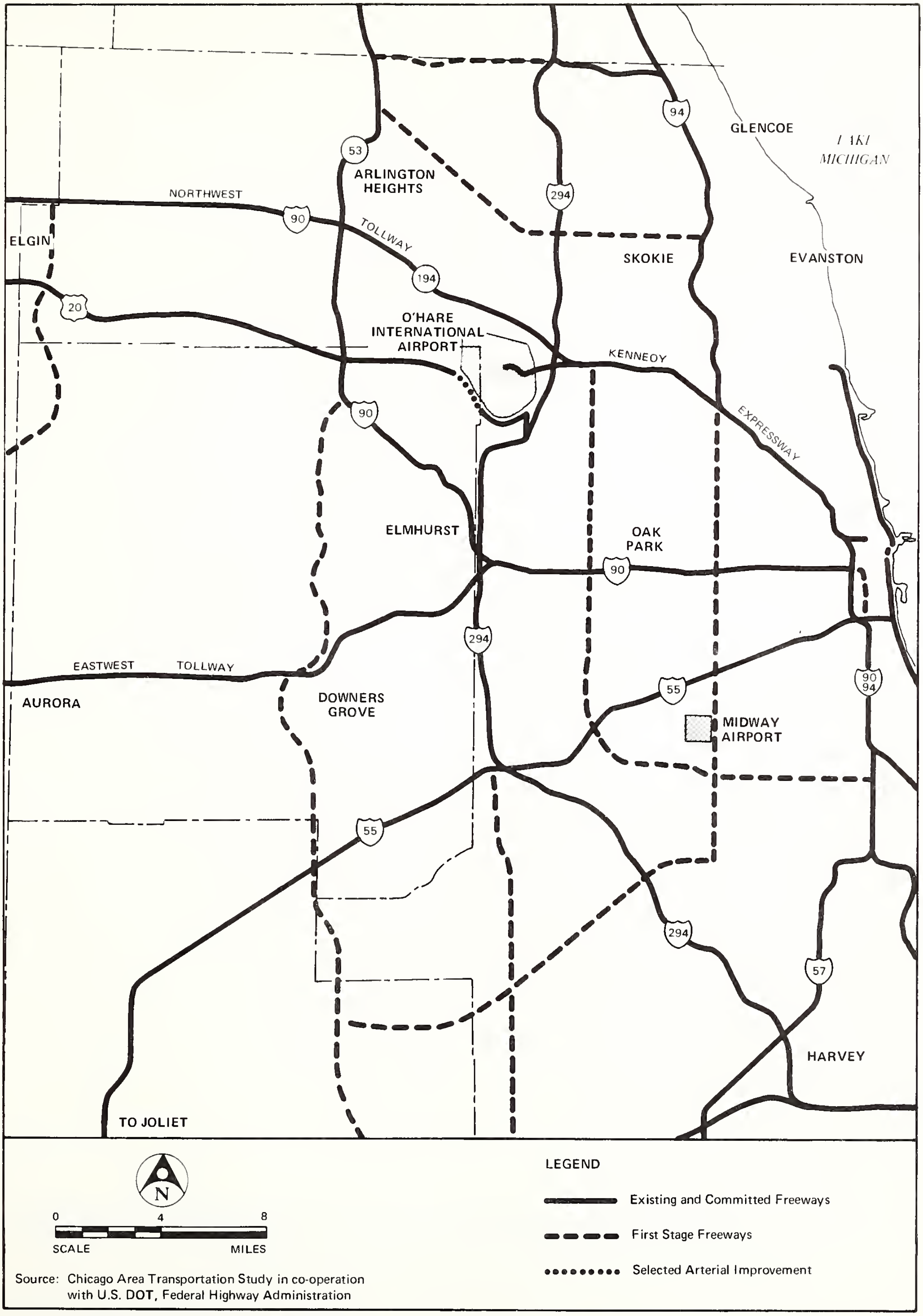
III. REGIONAL ACCESS SYSTEM

Although the CBD-O'Hare link is the major element in an access plan for O'Hare International Airport, the ability of the highway system and the highway travel modes to accommodate access volumes at the anticipated 30 million enplanement level in 1983 is critical. It is projected that approximately 54 percent of O'Hare air passengers will have their origin or destination outside the Chicago city limits at that time. A similar portion of employees at O'Hare will be residents of areas outside the City.[1/] This report section examines projected traffic volumes and the potential of anticipated highway improvements. Additionally, the future roles of access modes other than the private automobile are examined. Finally, the various aspects of information systems relating to airport access are described.

HIGHWAY ACCESS TO O'HARE

A number of planned and programmed street and highway improvements will affect the quality of highway access to O'Hare. The commitment to a large central parking facility serving the domestic terminal area essentially limits the range of potential street and highway improvements in the immediate vicinity of the airport. However, the continued development of a regional freeway network does present the possibility of significant improvements in the broader aspects of highway access. Figure III-1, indicating the geographic relationship of O'Hare to the regional network, and Figure III-2, showing the access roads pattern in the immediate vicinity of the airport, can be used to locate many of the specific improvements described in this section.

[1/] Chapter II, Volume I of this report.


94
GLENCOE
LAKE MICHIGAN
53
ARLINGTON HEIGHTS
294
NORTHWEST
90
TOLLWAY
ELGIN
SKOKIE
EVANSTON
194
20
O'HARE INTERNATIONAL AIRPORT
KENNEDY
EXPRESSWAY
90
ELMHURST
OAK PARK
90
294
EASTWEST
TOLLWAY
AURORA
55
DOWNERS GROVE
MIDWAY AIRPORT
90
94
55
294
57
HARVEY
TO JOLIET
N
0
4
8
SCALE
MILES
LEGEND
Existing and Committed Freeways
First Stage Freeways
Selected Arterial Improvement

Source: Chicago Area Transportation Study in co-operation with U.S. DOT, Federal Highway Administration

FIGURE III-1 INTERIM REGIONAL HIGHWAY PLAN

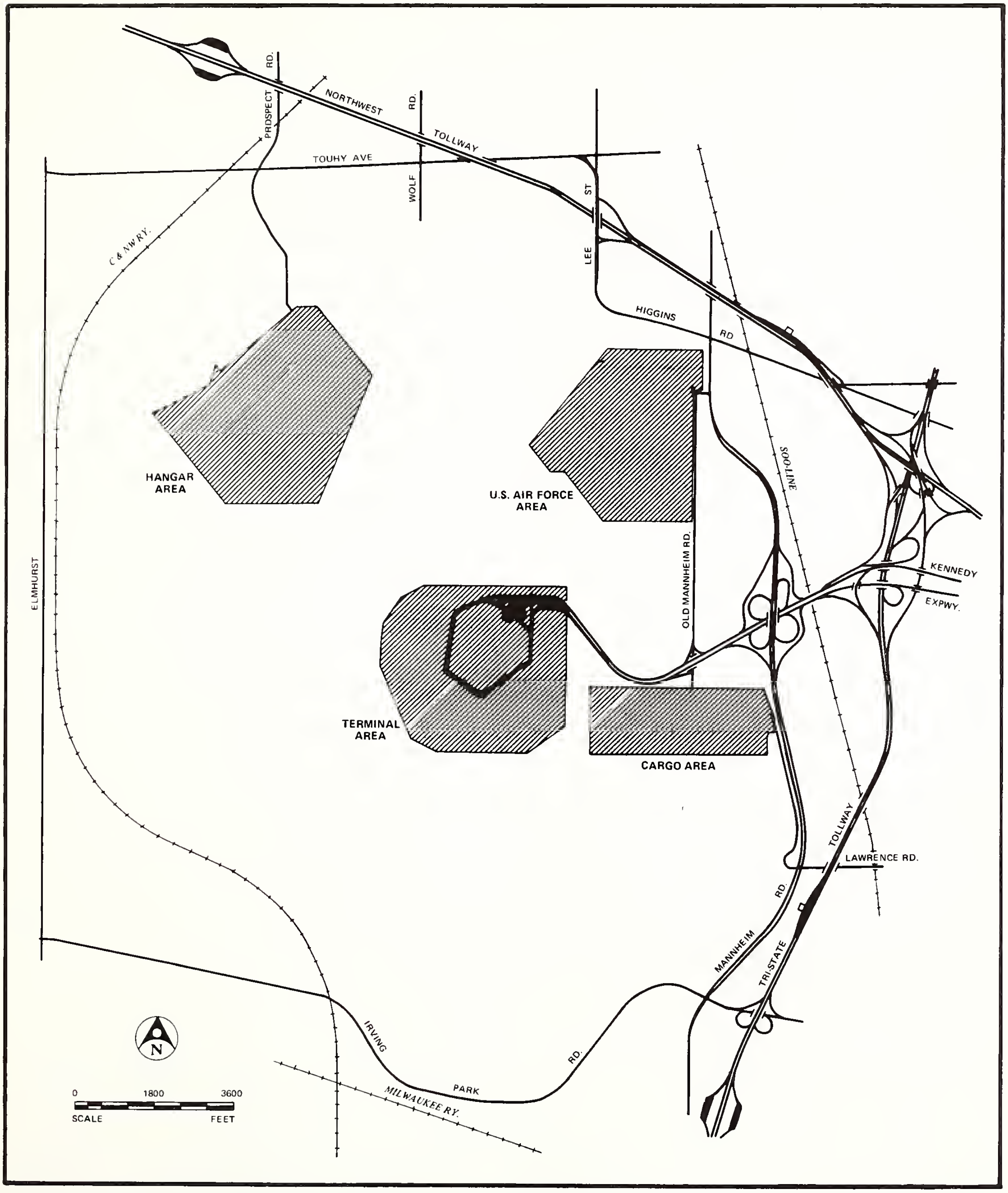

PROSPECT RD.
NORTHWEST TOLLWAY
WOLF RD.
TOUHY AVE
LEE ST
C & NW RY.
HIGGINS RD
SOO-LINE
HANGAR AREA
U.S. AIR FORCE AREA
OLD MANNHEIM RD.
KENNEDY EXPWY.
ELMHURST
TERMINAL AREA
CARGO AREA
TOLLWAY
LAWRENCE RD.
MANNHEIM RD.
TRI-STATE
IRVING PARK RD.
MILWAUKEE RY.
N
0
1800
3600
SCALE
FEET

FIGURE III-2 EXISTING PUBLIC ACCESS AND PERIMETER ROAD SYSTEM, O'HARE INTERNATIONAL AIRPORT

Projected Traffic Volumes

The projected Wednesday average daily traffic for a 30 million enplanement level is approximately 151,000 vehicles. The derivation of the projected traffic volume is summarized in Table III-1.

The projected ratio of entering vehicles to daily enplanements is 0.78. This varies significantly from the current ratio of 1.08, and also differs very significantly from a ratio of 1.35 which was developed in a 1970 study of internal access. Factors which contribute to the reduction in entering vehicles per enplanement are:

- The projected ratio of 0.78 assumes the extension of rapid transit to the airport. (To be conservative, the CBD-O'Hare alternative, which resulted in the lowest transit use of all alternatives studied, was assumed.)
- It is anticipated that employee productivity per enplaned passenger would improve by 20 percent relative to 1968 levels. This improvement is not incorporated into previous estimates of the vehicular traffic generated by the airport employment.
- It would appear that the large hotel recently completed within the terminal area would result in a reduction of vehicular trips well beyond the number of additional vehicular trips generated by its employees and visitors.
- As air travel becomes more commonplace for non-business purposes, it is expected that the travel related visitors per enplanement will decrease. This trend has already been substantiated at major terminals.

The distribution of trips is summarized in Table III-2. Important features of this distribution are:

- Almost one-half of all vehicular trips approach the airport on the Kennedy Expressway to the east of its junction with the Tri-State Tollway.
- Between the Tollway and Mannheim Road, approximately 85 percent of all vehicular traffic to and from the airport is on the entrance road.

TABLE III-1

SUMMARY OF PROJECTED DAILY O'HARE ACCESS VOLUMES - 1983
(Average Wednesday)

Source	Total Person Trips	Private Auto			Rental Auto			Taxi			Limousine			Transit		
		%	Person Trips	Vehicle Trips	%	Person Trips	Vehicle Trips	%	Person Trips	Vehicle Trips	%	Person Trips	Vehicle Trips	%	Person Trips	Vehicle Trips
Passengers	90,500	52	47,100	56,300	10	9,200	10,600	15	13,700	8,500	9	8,200	300	14	12,300	--
Employees	40,000	82	32,800	29,800	--	--	--	--	--	--	-	--	--	18	7,200	--
Visitors[1]	77,800	89	69,200	-- [2]	4	3,100	-- [2]	3	2,300	-- [2]	2	1,600	-- [2]	2	1,600	-- [2]
Residual Users	40,600	91	37,000	31,800	--	--	--	--	--	--	-	--	--	9	3,600	--
TOTAL	248,900		186,100	117,900		12,300	10,600		16,000	8,500		9,800	300		24,700[3]	--

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[1] Travel Related Visitors only; Casual Visitors are included in Residual Users.

[2] Visitor Vehicles are included in Passenger Vehicles.

[3] Trips to and from O'Hare Airport rapid transit station only.

TABLE III-2

DISTRIBUTION OF PROJECTED VEHICLE ACCESS TRIPS

		Access Route						
Source	Origin or Destination	Kennedy Expwy.	North-West Tollway	Tri-State Tollway North	Tri-State Tollway South	Mann-heim Road North	Mann-heim Road South	Totals
Passenger[1/]	-CBD	28.0	0.0	0.0	0.0	0.0	0.0	28.0%
"	-Chicago, Excluding CBD	11.0	0.0	0.0	2.8	1.8	2.8	18.4%
"	-CATS, Excluding Chicago	6.5	4.8	6.5	6.5	3.2	4.8	32.3%
"	-Outside CATS Cordon	4.3	4.3	6.4	6.3	0.0	0.0	21.3%
Total Passenger		49.8	9.1	12.9	15.6	5.0	7.6	100.0%
Employee	-CBD	1.0	0.0	0.0	0.0	0.0	0.0	1.0%
"	-Chicago, Excluding CBD	27.6	0.0	0.0	6.9	4.6	6.9	46.0%
"	-CATS, Excluding Chicago	9.8	7.4	9.8	9.7	4.9	7.4	49.0%
"	-Outside CATS Cordon	0.8	0.8	1.2	1.2	0.0	0.0	4.0%
Total Employee		39.2	8.2	11.0	17.8	9.5	14.3	100.0%
TOTAL (Weighted)		47.3%	8.8%	12.4%	16.1%	6.2%	9.2%	100.0%

[1/] Includes Visitors and Residual Airport Users.

- Approximately 15 percent of the vehicular traffic uses surface arterials for access to the airport. This traffic consists of employees entering the cargo area from Mannheim Road; employees entering the hangar area from Touhy Avenue; employees entering the U. S. Air Force area from Higgins Road and Mannheim Road; and air passengers entering the entrance road from Mannheim Road from the north and south.

Highway Improvements Affecting O'Hare Airport

Table III-3 summarizes highway improvements which will have an impact on traffic related to O'Hare Airport. Of the improvements summarized in Table III-3, the following are of major significance:

- The Eisenhower Expressway extension (I-90) serves to complete an expressway loop around the airport. It is expected that this facility will reduce traffic volumes on the Northwest Tollway between I-90 and the Tri-State Tollway, and on the Tri-State Tollway between the Kennedy Expressway and I-90. Reduction in these volumes leads, in turn, to reduction in ramp volumes in the Tollway/Kennedy interchange.
- The upgrading of Mannheim Road from Lake Street to Irving Park Road will serve to make Mannheim Road more attractive as a surface alternative to the airport from suburban areas to the south and southeast of the airport. Increased use of Mannheim Road will result in volume reduction on the Tri-State Tollway south of the Kennedy interchange as well as reduced ramp volumes at the Tollway/Kennedy interchange.

Deficiencies in Existing Highway Access

Deficiencies in the Highway Access System include both capacity and mobility problems. Major capacity problems not expected to be corrected by improvements within the near future include:

- The Airport Entrance Road -- In a 1970 study,[1/] the extension of the Kennedy Expressway west of Mannheim Road

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[1/] Alan M. Voorhees & Associates, Inc., Ground Transportation Systems Analyses, Chicago O'Hare International Airport, 1970.

TABLE III-3

SUMMARY OF PROGRAMMED HIGHWAY IMPROVEMENTS AFFECTING ACCESS TO O'HARE AIRPORT

1. The completion of Interstate 90 from U.S. 20 to a point south of Higgins Road connects the Eisenhower Expressway to the Route 53 Expressway and should relieve both the Tri-State and Northwest Tollways around O'Hare. A slight diversion from the Kennedy may also result. In total, a more balanced flow system in the vicinity of O'Hare should be experienced.

2. Mannheim Road from Lake Street to Irving Park Road is to be rebuilt with an improved cross-section in 1974. This will improve O'Hare access via Mannheim, which is currently congested, and may afford some diversion from the Tri-State.

3. Golf Road (Ill. 58) will be rebuilt from the Tri-State to Harlem Avenue in 1973 and is to be rebuilt from Barrington Road to Meacham Road in 1976 or 1977. Mannheim Road from Golf Road to Touhy Avenue will also be widened and resurfaced in 1975 or 1976. These three improvements will improve local access to O'Hare from the north.

4. Construction of the Route 53 Expressway from Ill. 68 to a point in Lake County might begin in 1974. This will complement the extension of I-90 (Item 1).

5. The Elgin-O'Hare Freeway from York Road to a point near Elgin should be under construction in late 1974 or 1975. This will improve access to the O'Hare vicinity, but the missing link east of York Road will be needed to achieve significantly improved access to the terminal. Even then, the link of Mannheim between Irving Park Road and the O'Hare Access Road may prove to be a bottleneck during peak periods.

6. Illinois Route 83 from Devon Avenue to Woodland Avenue will be rebuilt as a divided highway with partial control of access during 1973. This will help to balance traffic flows around O'Hare.

Table III-3 (Continued)

7. There will be an intersection improvement at Touhy Avenue and River Road in 1973 or 1974. Improvements under the TOPICS plan also have been made or are programmed at the following intersections.

   - Des Plaines River Road and Bryn Mawr Avenue
   - Cumberland Avenue and Bryn Mawr Avenue
   - Various intersections along Touhy Avenue in Park Ridge

8. Two major freeway proposals that will affect access to O'Hare and access between O'Hare and Midway are the Crosstown Expressway in the Cicero Avenue Corridor and the West Suburban Freeway in the First Avenue Corridor (including the Crosstown leg south of Midway). These are long-range plans, post 1985, and many right-of-way problems (for the less publicized West Suburban as well as the Crosstown) will have to be resolved prior to development of the facilities.

was determined to be inadequate for an airport passenger volume of 30,000,000 annual enplanements. As noted earlier, revision of vehicular traffic estimates and the assumption of a rapid transit extension to the airport results in substantially lower vehicular volumes than those projected in 1970. Revised estimates of vehicular traffic generation indicate a peak hour single direction volume of slightly less than 5,000 vehicles on the entrance road. Thus, this roadway has sufficient capacity to accommodate the peak hour flow at the 30 million enplanement level; however, service will deteriorate to an unsatisfactory level (Level "D") during at least the daily peak hour, and probably for a two to three hour period daily.

- The Tollway/Kennedy Interchange Ramps -- Various ramps within this complex are regularly operating below acceptable levels of service. Major obstacles to any improvement at this interchange include geometric constraints and toll collection requirements.
- Internal Circulation -- It is anticipated that internal circulation on the primary roadway (i.e., the "loop road" serving the terminals) can be maintained at a satisfactory level of service following the completion of improvements now under construction. Some general deficiencies in the secondary road system, noted in the 1970 circulation study, remain uncorrected. These deficiencies include lack of adequate turning radii, lack of signing and pavement markings, lack of street lighting, insufficient attention to regulatory signing and absence of all-weather shoulders.

Expressway access to the airport is provided by the Tollway system and the Kennedy Expressway. The overwhelming majority of longer distance trips are accommodated on these facilities. The only concentration of passenger origins and destinations not well served by the existing freeway system are along the North Shore suburbs (Skokie, Evanston, Wilmette, etc.).

West of Mannheim Road, there are no mobility problems for air passengers or travel-related visitors since the entrance road is the direct and only means of access to the terminal area. Motorists using the Northwest

Tollway or the Tri-State Tollway are required to pass through the Tollway/Kennedy interchange. The partial interchanges at the Northwest Tollway at Lee Street and the Tri-State Tollway at Irving Park Road do not permit Tollway traffic to exit and approach the airport on Mannheim Road. Although little additional travel distance results from this inability to use Mannheim Road, it is possible that substantial delays could occur at times when the Tollway/Kennedy interchange is congested. When the International Terminal is relocated at the current Air Force installation site, the loss in mobility due to the partial interchange at the Northwest Tollway and Lee Street will become more obvious, particularly for motorists traveling to the proposed International Terminal.

The lack of full interchanges on the Tollway results in somewhat more obvious mobility problems for employees in the cargo, Air Force installation and hangar areas. Specifically, motorists leaving the cargo area and intending to use the Tollway southbound cannot enter at Irving Park Road, but instead must use Mannheim Road and the airport entrance road and pass through the Tollway/Kennedy interchange area. Similarly, employees leaving the Air Force installation area and intending to use either the Northwest Tollway or the Tri-State Tollway southbound must likewise use Mannheim Road and the airport entrance road and must also pass through the Kennedy/Tollway interchange.

Improvement Alternatives

Three feasible alternative strategies for the improvement of highway access at O'Hare are:

- Provide three lanes throughout the entire airport entrance road by either (1) converting the Mannheim interchange to a diamond interchange, releasing the present weaving lane for use as a through lane, or (2) widening the Soo Line Railroad and Mannheim interchange structures to permit three full lanes in addition to a full interchange at Mannheim.

Under either improvement described above, the Tollway exit ramp to the entrance road westbound would continue as the third westbound lane on the entrance road.

- Provide four lanes throughout the airport entrance road by (1) widening at the Soo Line Railroad and Mannheim Road structures, and (2) minor widening of the entrance road west of Mannheim, and installation of four 11-foot lanes. Under this configuration, two exit ramp lanes from the Tollway to the entrance road westbound would continue as the third and fourth westbound lanes on the entrance road.
- Develop other points of highway access to O'Hare Airport. The primary emphasis of this alternative strategy is the diversion, to the maximum extent possible, of passengers and travel-related visitors from the entrance road and encouraging instead the use of Mannheim Road. As a secondary objective, cargo area traffic would be encouraged to use the access point at Mannheim Road and Lawrence Avenue exclusively. Relocation of the International Terminal affords the opportunity for further diversion of passenger and travel-related visitors from the entrance road.

Costs of the alternative improvements to the airport entrance road are summarized in Table III-4.

Some other features of the various alternatives should be noted:

- The major difference between Alternatives 1(a) and 1(b) is the conversion of the Mannheim interchange to a diamond interchange under 1(a). The two critical operational points of the diamond interchange would be the at-grade left turn movements associated with movement from Mannheim northbound onto the entrance road westbound, and from the entrance road eastbound onto Mannheim northbound. The expected peak hour volumes for the movements described above will not exceed the capacity of a properly designed diamond interchange.
- The widening of the airport access road to four lanes under Alternative 2 is of limited benefit, since the capacity provided by four lanes west of the Tollway junction will far exceed the capacity of the combination Kennedy Expressway/ Tollway ramps connecting with the entrance road. The critical capacity constraint in the present and future highway access system is the Kennedy Expressway through the

TABLE III-4

COST OF HIGHWAY IMPROVEMENT ALTERNATIVES

Section and Item	Alternative 1(a) Three Lanes Throughout Entrance Road, Diamond Interchange	 1(b) Three Lanes Throughout Entrance Road, Widen Mannheim, Soo Line Structures	 2 Four Lanes Throughout Entrance Road
Section (all items)			
Tollway to Mannheim[1]	$553,000	$853,000	$1,321,000
Mannheim[2] to Taxiway Overpass	--	--	235,000
Taxiway Overpass to Terminal[3]	--	--	73,000
Total, All Sections	$553,000	$853,000	$1,629,000
Item (all sections)			
Pavement Removal	$ 17,000	$ 50,000	$ 50,000
New Pavement	300,000	366,000	838,000
Shoulder Removal	13,000	25,000	25,000
New Shoulder	163,000	96,000	184,000
Highway Bridge Work	--	216,000	432,000
Railroad Overpass and Track Work	--	100,000	100,000
Traffic Signals	60,000	--	--
Total, All Items	$553,000	$853,000	$1,629,000

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[1] Access Road westbound at nose of ramp from Tollway.

[2] Access Road westbound at nose of ramp from Mannheim Road.

[3] Beginning of separation of roadways for terminal loop.

> interchange with the Tollway. This section of the Kennedy Expressway will not be affected by widening the entrance road to four lanes. Thus, the major benefit of Alternative 2 is the improvement in the level of traffic service within the airport during the peak three or four hours daily. However, capacity of the external highway access system will not be improved.

Strategy 1(a), the provision of three lanes throughout the airport entrance road and the conversion of the Mannheim Road interchange to a diamond interchange, is the most cost-effective alternative for the improvement of access. Strategy 1(b), the widening of the Mannheim Road and Soo Line structures, involves substantially more cost than Alternative 1(a) and yields only the small additional advantage of slightly improved traffic operations at the Mannheim-entrance road interchange. Alternative 2, the provision of four lanes throughout the airport entrance road and the widening of the Mannheim and Soo Line structures, is not in scale with the existing or planned external roadways serving the airport and yields only marginal improvements relative to Alternatives 1(a) or 1(b).

In addition to the improvements included in Alternative 1(a), it is also recommended that alternate points of access be developed. This strategy would incorporate the following specific improvements:

- Construction of additional ramps on the Northwest Tollway at or in the vicinity of Lee Street.
- Construction of a full interchange on the Tri-State Tollway at Irving Park Road.
- Provision of access from Higgins Road to the new International Terminal.

At present, approximately 9 percent of all airport traffic uses the Northwest Tollway. A very substantial amount of this traffic would be diverted from the Tollway to Lee Street, Higgins Road, and Mannheim Road if full access to and from the Tollway were provided at this point.

Traffic diverted at this point would otherwise pass through the Tollway/ Kennedy interchange; thus, any diversion east of Lee Street would reduce traffic volumes at their most critical point (i.e., in the Tollway/Kennedy interchange). Diverted traffic would rejoin the airport entrance road west of Mannheim Road.

In addition to reduction of traffic volumes in the Tollway/Kennedy interchange, the provision of a full interchange on the Northwest Tollway at Lee Street would yield substantial benefits to all airport traffic on the Northwest Tollway:

- Full access at Lee Street would reduce travel distance from (to) the Northwest Tollway to (from) the Main Terminal by 0.8 mile.
- Full access at Lee Street would reduce travel distance to and from the planned International Terminal site by 2.5 miles.
- Full access at Lee Street would eliminate five potential merging conflicts for trips to the Main Terminal, and three potential conflicts for trips from the Main Terminal.[1/]
- Full access at Lee Street would eliminate five potential merging conflicts for trips to the New International Terminal, and five potential conflicts for trips from it.[1/]

At present approximately 12 percent of all airport traffic uses the Tri-State Tollway south of the airport. Substantial portions of this traffic would be diverted from the Tollway to Mannheim Road at Irving Park if full access to the Tollway were possible at this point. Traffic diverted in this manner would represent traffic currently using the Tollway/ Kennedy interchange and thus this diversion would reduce volumes at their most critical point.

[1/] A potential merging conflict occurs whenever a vehicle travels through a merging section, regardless of whether approached from a ramp or main line.

It is important that access to the proposed International Terminal from the north be as attractive as possible, in order to encourage the use of the Lee Street interchange on the Northwest Tollway. Thus, it would be desirable to have direct access to the International Terminal from Higgins Road, permitting traffic approaching from the north (i.e., from the Lee Street interchange) to enter the terminal area without passing through the Higgins/Mannheim intersection. It is also desirable to have direct access to the International Terminal from both Mannheim and Old Mannheim Roads. Traffic approaching the International Terminal from the Kennedy Expressway can use Mannheim Road directly, and traffic from the cargo area can use Old Mannheim Road directly. The proposed International Terminal area has good access from the Main Terminal area by means of Mannehim Road, and has additional access via Old Mannheim Road.

TAXI AND LIMOUSINE SERVICES

The various public transportation modes using the highways will continue to play a major role in O'Hare access as air travel grows to the 30 million annual enplanement level. As described in Chapter V of Volume I, it is estimated after the CTA extension to O'Hare is in operation, taxi and limousine/coach services will be used for 32 and 30 percent, respectively, of air traveler trips to the CBD as opposed to the 41 and 42 percent observed in 1969. To areas outside the Chicago CBD, limousine/coach travel will drop from 7 to 5 percent, while taxi trips will remain at 28 percent of the total. A plan for improvement of all access to O'Hare must consider the attributes of these services and their potential.

Range of Services

The public transportation services available at O'Hare and at other major airports may be defined as follows:

- Transit Services -- are normally the extensions of local bus routes to airports, and are usually designed to serve employees, charging only a small premium over regular transit fares. The O'Hare Express between the airport and the CTA Jefferson Park Station does attract some air travelers.
- Limousine/Coach Services -- have fixed terminals and routes, and are operated on fixed schedule to major activity centers. Fares are significantly higher than transit fares. Continental Air Transport's services at O'Hare generally fall in this category.
- Reservation/Limousine Services -- have fixed terminals, flexible routes and usually operate on demand only. Charges are frequently higher than for corresponding scheduled services.
- Livery/Group Riding Services -- provide door-to-door services with charges that are below those of taxis. Frequently these are prohibited from picking up passengers at the airport except by pre-arrangement, as is the case with such services at O'Hare.

- Taxis -- provide the ultimate in door-to-door service, but at the greatest cost of the public transportation modes.
- Courtesy Cars -- provide free transportation to nearby hotels and motels, remote car rental facilities, and outlying passenger and employee parking areas. Courtesy vehicles constitute a significant part of the terminal area traffic stream during certain hours.

The services described above are not mutually exclusive. At many airports a single operator may operate variations of several of the services.

Guidelines for Service Expansion

The expansion of access services to complement the CBD-O'Hare facility should focus on three service categories:

- Scheduled Limousine/Coach Services to the Chicago CBD can be expected to remain viable although the magnitude and geographic pattern of demand can be expected to undergo change. There is probably limited possibility of major expansion of these services to additional areas. In order for a high level of service to be maintained, the points served must be ones of concentrated activity.
- Reservation/Limousine Services, providing service on a demand or a partially scheduled basis, is a mode that may present good opportunity for expansion. Key to any expansion will be the location of satellite points where parking, reservation telephones, and shelter would be available. Suburban shopping centers and motels, in particular, are candidate locations.
- Livery/Group Riding services offer a means for expansion of service into areas which are difficult to serve with any of the limousine services. Care and caution must be exercised in the development of such services -- an effective radio communications system to increase vehicle occupancy is essential. The development of demand-responsive technology and the experience being gained in demonstrations of such service can be of assistance in the implementation of group riding services. Any demand-responsive services developed for local service in communities in the region might provide airport service as an adjunct to their operations.

Role of the Airport Operator

The City of Chicago, in the role of the airport operator, has the responsibility for the effective transfer of the air traveler between air and ground transportation modes. Traditionally, the airport operator has franchised selected operators with the objective of insuring a high standard of service, as well as assuring a source of revenue to aid in offsetting airport operating costs. It is within this institutional framework that any plan for improvement of access services must operate. The objective must be to provide the airport user with the most effective means of ground transportation at the lowest possible cost. One element of this objective should be the provision of convenient, easily-identified loading areas for vehicles of the various public transportation access modes.

PUBLIC TRANSPORTATION ACCESS INFORMATION

The existence of an effective information system is vital to advantageous and effective utilization of airport access opportunities by airport users. It is the air traveler at which the system must mainly be aimed, although the system should be comprehensive in all respects.

Audience for Access Information

Typically, the primary audience for airport access information will include the following:

- The local resident who must make a choice -- at home or office -- between use of a private automobile for his trip to the airport and a public transportation mode. His eventual return trip will be a major factor affecting the decision.
- The non-resident arriving at the airport who must make a choice between taxi or auto rental and a less expensive public mode. The local resident returning by air who finds his usually private auto mode not available is also in this category.

- The non-resident -- at a local motel or hotel -- who must plan his return trip -- the choice usually between a taxi and a less expensive public mode.

It should be emphasized that air travelers exhibit a wide range of values and tolerable limits with respect to cost, comfort and convenience, and travel times. An information system should avoid assumptions of the most appropriate choices for users in certain places and situations.

Types of Access Information

The types of information that should be available to the user in order for him to make his choice, and then implement the decision, include:

- Identification of available services to specific areas.
- Characteristics of available services -- hours of availability, routing, frequency, and cost.
- Location of boarding points for such service.
- Sources of additional information for each service -- such as information counters, courtesy telephones, telephone numbers, and reference to the Yellow Pages.

Access information at O'Hare at the present time mainly consists of signs directing air travelers to taxi, limousine, transit, and courtesy car services through appropriate exit doors at the baggage claim areas. An information booth operated by Continental Air Transport provides information relating only to its own services. Curbside signs do indicate specific stop locations for the CTA O'Hare Express bus connection to Jefferson Park station. (Construction activity during much of 1972 and 1973 has caused disruption in normal use of curb loading space, with make-shift signing for some modes in evidence.)

An Information System Plan

A plan for an access information system should include the following elements:

- Informational Signing -- Descriptions of available services should be posted at key locations -- in the terminal at the baggage claim area, and at those other points where deplaning passengers will normally be expected to initially consider their mode of departure. Other appropriate locations for posted airport access information include hotels, transportation terminals, civic and convention center facilities, auditoriums, athletic arenas, etc. in the CBD and suburbs.
- Directional Signing -- In the airport it is necessary that the deplaning air passenger be directed to the point where he can obtain access information, as well as being directed to use the most direct route to the boarding point for the appropriate vehicle. Loading areas should be clearly marked as to the services that load there, and vehicles should all bear signs consistent with previous information furnished the user. It is vital that the user be continually reassured that he is in the right location for the desired service. (At the recently opened Mid-Continent Airport serving the Kansas City region, public transportation service loading areas are clearly marked by an overhead sign describing the service -- limousine/coach, inter-terminal, remote parking, taxi, and courtesy cars. All but courtesy vehicles are the same color as the designating sign.) Away from the airport, directional signing should indicate limousine service stops, including the specific loading areas at hotels, motels, transportation terminals, etc. When the CTA extension to O'Hare is in operation, an airport access designator should identify rapid transit stations.
- Informational Brochure -- The development of an informational brochure for public transportation access modes can be an effective step disseminating access information. A brochure should normally provide the same information that is posted at the airport, as described on the previous page. Although the brochure should not contain detailed schedules, hours of availability should be described, and the means of obtaining further information given. Comprehensive distribution of the brochure is necessary; distribution at the airport is not enough; development of a continuous method for distribution is as important as the development of the brochure itself. It

is recommended that the City of Chicago develop the brochure as an airport service. Although occasionally brochures are developed through funds from advertising in the brochure itself, experience indicates that the public service document is invariably superior in completeness and clarity.[1]

- Information Booth -- The provision of an information booth providing for all public transportation services can be an effective way of providing guidance to air travelers in a high volume terminal. It is important that the location of the booth be made prominent and directional signing to it be provided.

CBD-O'Hare Rapid Transit Information -- The plan for an information system must give specific and extraordinary attention to maximum awareness of the access opportunities provided by the CBD-O'Hare link. All rapid transit stations should have clear directions posted indicating the route and transfers, if necessary, to O'Hare; published CTA schedules and guide maps should indicate means of surface access to the airport rapid transit facility; and directional signing should make the deplaning passenger aware of rapid transit availability as soon as he departs the gate area.

HIGHWAY ACCESS INFORMATION

The visitor and air traveler using private automobiles and rental cars, as well as the occasional user of air cargo facilities, have particular

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[1] Examples of public service brochures are those produced by the Port Authority of New York and New Jersey for the three New York City airports, and by Canadian Department of Transport for Toronto International Airport. These agencies also produce a separate brochure for terminal facilities. PANYNJ also produces guides to parking at the airports, and a guide to its air cargo centers at JFK and Newark Airports.

needs for highway signing and direction. A terminal facilities brochure -- with proper distribution -- can be of assistance. Beyond the immediate vicinity of the airport, highway signing[1/] is usually of the types:

- Freeway Signing
- Highway Roadside Signing
- Trailblazers

The extent of such signing usually depends on the type of highway link. For example, airport signing on a major regional freeway may extend 20 or 30 miles; on an arterial street, only for two or three miles.

Many airports have made effective use of trailblazers incorporating a directional arrow. In the O'Hare situation, these could be particularly effective in directing regular users to preferred or alternate routes, such as the cargo area, in order to relieve overcrowded highway links.

Although much of the responsibility for external airport highway signing rests with highway agencies, the City, as airport operator, should monitor the effectiveness and consistency of the signing as part of an access information system plan.

[1/] For standards refer to Manual for Signing and Pavement Marking of the National System of Interstate and Defense Highways, American Association of State Highway Officials; and Manual of Uniform Traffic Control Devices for Streets and Highways, U. S. Department of Commerce, Bureau of Public Roads.

ERRATA

Figure II-1: Old Mannheim Road should be shown as continuous through its interchange with the O'Hare Access Road.

Figure II-6: The footnote to the Yard Capacity listing should indicate that the 33 car item described is for the Internal Access System proposed by others.

River Road should be indicated as Des Plaines River Road.

Figure II-15: In the NW corner of the rail loop, the IA (Internal Access System proposed by others) should be shown on the CTA alignment rather than on track connection to PDS (Passenger Distribution System, proposed by others).

The NE corner of the rail loop should be designated CTA, rather than IA.

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